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Workshop: How to Solve Mathematics Problems Using Casio Classwiz fx-570EX

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Boost your Curiosity

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F1	Chapter 1 / Bab 1: Rational Numbers / Nombor Nisbah

1.1 Integers / Integer
1.2 Fractions / Pecahan
1.3 Decimal/ Perpuluhan

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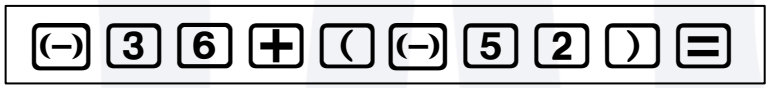
1.1 Integers / Integer

Whole numbers with positive (+) or negative (-) signs including zero

- Find the Value of each of the following

(a) $-36 + (-52) =$



(b) $56 + (-60) + 32 =$

(c) $-69 - 43 =$

(d) $113 + 63 - 59 + (-91) =$

Answer:

(a) -88

(b) 28

(c) -112

(d) 26

1.2 Fractions / Pecahan

- Find the Value of each of the following

(a) $\frac{2}{20} + \left(-3\frac{9}{4}\right) =$

(b) $-15 \div 3\frac{5}{9} + (-2\frac{3}{27})\times(-3) =$

(c) $2\frac{9}{10} \times 3 + \left(-\frac{5}{10}\right) \div \frac{2}{5} =$

(d) $\frac{13}{3\times5} + 2\frac{3}{5} - 3\frac{1}{3} =$

Answer:

(a) $-\frac{103}{20}$

(c) $\frac{149}{20}$

(b) $\frac{203}{96}$

(d) $\frac{2}{15}$

1.3 Decimal / Perpuluhan

- Find the Value of each of the following

(a) 89.9 - 5.26 +(- 3.27)=

(b) -0.7(-2) + (-5)(0.8) – (-5)(3.8)=

(c) 12.67 x (-2.345 + 34.65) – 110.5 =

(d) 83.8 ÷ (- 6.2) x 9.67 =

Answer:

(a) $\frac{8137}{100}$ *or* 81.37

(b) $\frac{82}{5}$ *or* 16.4

(c) 298.80435

(d) -130.7009677

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F1	Chapter 2/ Bab 2: Factors and Multiples / Faktor dan Gandaan

2.1 Prime Numbers / Nombor Perdana
2.2 Prime Factors / Faktor Perdana
2.3 Highest Common Factor (HCF) / Faktor Sepunya Terbesar (FSTB)
2.4 Lowest Common Multiple (LCM) / Gandaan Sepunya Terkecil (GSTK)

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2.1 Prime Numbers / Nombor Perdana

Prime numbers such as 2, 3, 5, 7,11, 13, 17, 19,23,……,?????

- Determine whether each of the following numbers are a prime number.

(a) 54

Command	Screenshot
5 4 = SHIFT °,,,	54 2×3^3

(b) 81

(c) 95

(d) 113

(e) 171

Answer:

(a) No

(b) No

(c) No

(d) Yes

(e) No

* If the answer is displayed in the form of **prime factorization**, then the number is **not a prime number** because can be divided by number other than 1 and the number itself.

* If the answer is **unchanged**, then the number is **a prime number** because can not be divided by other numbers except 1 and the number itself.

2.2 Prime Factor / Faktor Perdana

A prime factor of a number is a factor which is a prime number

- How to determine prime factor of a number?

1) Method 1:Listing all the factors of the number
2) Method 2 :Using **CLASSWIZ**

- Find the numbers of factor for:-

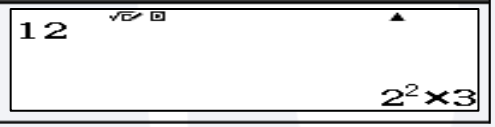
(a) 12

Method 1: Listing all the factors of the number

Factor of 12: 1, 2, 3, 4, 6 and 12

Answer: Prime factor of 12 are **2 and 3**

Method 2: Using Classwiz

Command	Screenshot
1 2 = SHIFT °,,,	12 

(b) 30 (Ans: 2, 3 and 5)

(c) 42 (Ans: 2, 3 and 5)

(d) 154 (Ans: 2, 7 and 11)

2.3 Highest Common Factor (HCF) / Faktor Sepunya Terbesar (FSTB)

- **Common Factor** is the number which is a factor of all the given numbers.
- **HCF** is the biggest common factor of all the given numbers
- There are four methods to determine HCF / GSTK
    (1) Listing / Penyenaraian
    (2) Repeated division / Pembahagian berulang
    (3) Prime factorization / Pemfaktoran Perdana
    (4) Support with Classwiz Calculator / Bantuan Kalkulator Classwiz

- Find the HCF/ FSTB of the numbers below:-

(a) 28 and 42 (Ans: 14)
(b) 8 and 24 (Ans: 8)
(c) 42 and 56 (Ans:14)

Solution

➢ **Find the HCF / FSTB of the numbers below:-**

(a) 28 and 42

Method 1: Listing / Penyenaraian

Factors of 28: **1**, **2**, 4, **7**, **14**, 28

Factors of 42: **1, 2**, 3, 6, **7, 14,**21, 42

Common factors of 28 and 42: 1, 2, 7, 14

Thus, HCF / FSTB of 12 and 42: **14**

Method 2: Repeated division / Pembahagian berulang

2	**28,**	**42**
7	**14,**	**21**
	2	**3**

Thus, HCF / FSTB of 28 and 42: 2 x 7 = **14**

Method 3: Prime Factorization / Pemfaktoran perdana

28 = **2** x 2 x **7**

42 = **2** x 3 x **7**

Thus, HCF / FSTB of 28 and 42 : 2 x 7 = **14**

Solution

Method 4 : Support with Classwiz Calculator / Bantuan Kalkulator Classwiz

➢ **Step 1**: Find the prime factors of 28 and 42

Prime factor of 28:

Command	Screenshot
2 8 = SHIFT °,,,	

2^2 x 7= **2** x 2 **x 7**

Prime Factor of 42:

Command	Screenshot
4 2 = SHIFT °,,,	

2x 3 x 7= **2** x 3 **x 7**

➢ **Step 2**: Multiply all the common prime factor

Thus, HCF / FSTB of 28 and 42 is **2 x 7** = 14

2.4 Lowest Common Multiple (LCM) / Gandaan Sepunya Terkecil (GSTK)

- **Common Multiple** is the number which is a multiple of all the given numbers.
- **LCM** is the smallest common multiple of all the given numbers.
- There are four methods to determine LCM / GSTK
  - (1) Listing / Penyenaraian
  - (2) Repeated division / Pembahagian berulang
  - (3) Prime factorization / Pemfaktoran Perdana
  - (4) Support with Classwiz Calculator / Bantuan Kalkulator Classwiz

- Find the LCM / GSTK of the numbers below:-

(a) 4 and 12 (Ans: 12)

(b) 12 and 18 (Ans: 36)

(c) 8 and 20 (Ans : 40)

Solution

- **Find the LCM / GSTK of the numbers below:-**

(a) 4 and 12

Method 1: Listing / Penyenaraian

Multiples of 4: 4, 8, 12, 16, 20, 24, 28, 32, 36,……

Multiples of 12: 12, 24, 36, 42, 60, 72,…….

Common multiples of 4 and 12: 12, 24, 36,…

Thus, LCM / GSTK of 4 and 12: **12**

Method 2: Repeated division / Pembahagian berulang

2	4, 12
2	2, 6
	1 3

Thus, LCM / GSTK OF 4 and 12: 2 x 2 x 1 x 3 = **12**

Method 3: Prime Factorization / Pemfaktoran perdana

4 = **2 x 2**

12 = 2 x 2 x 3

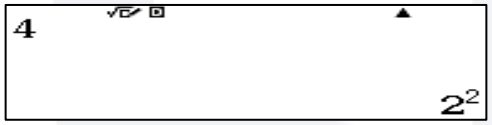
Thus, LCM / GSTK of 4 and 12 **: 2 x 2** x 3 = **12**

Solution

Method 4: Support with Classwiz Calculator / Bantuan Kalkulator Classwiz

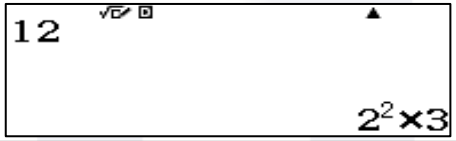
➢ Step 1: Find the prime factors of 4 and 12

Prime factor of 4:

Command	Screenshot
4 = SHIFT °,,,	

2^2= **2 x 2**

Prime Factor of 12:

Command	Screenshot
1 2 = SHIFT °,,,	

2^2x 3 = **2 x 2** x 3

➢ Step 2: Multiply all the common prime factor with other factor

Thus, LCM / GSTK of 4 and 12 is **2 x 2** x 3 = 12

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F1	**Chapter 3 / Bab 3:** **Squares, Square Roots, Cubes and Cube Roots /** **Kuasa Dua, Punca Kuasa Dua, Kuasa Tiga dan Punca Kuasa Tiga**

3.1 Squares and Square Roots / Kuasa dua dan Punca Kuasa Dua
3.2 Cubes and Cube Roots / Kuasa Tiga dan Punca Kuasa Tiga

3.1 Squares and Square Roots / Kuasa Dua dan Punca Kuasa Dua

- **Squares** is the number multiplied by itself and the symbol is ^{2}
- **Square roots** is a number when multiplied by itself, equals the given number and symbol is $\sqrt{}$

- Find the values of the following:-

(a) $28^2 = 28 \times 28 =$ (Ans : 784)

(b) $4^2 + 5^2 \times 3^2 =$ (Ans : 241)

(c) $(\frac{3}{7})^2 - \left(\frac{1}{7}\right)^2 =$ (Ans : $\frac{8}{49}$)

(d) $\sqrt{16} + \sqrt{49} =$ (Ans : 11)

(e) $\sqrt{\frac{36}{64}} + \sqrt{25} \times \sqrt{2\frac{14}{25}} =$ (Ans : $\frac{35}{4}$)

(f) $\sqrt{1\frac{9}{16}} - 3 \times 3^2 + \sqrt{25} =$ (Ans : $-\frac{83}{4}$)

3.2 Cubes and Cube Roots / Kuasa Tiga dan Punca Kuasa Tiga

- **Cubes** is the number multiplied by itself twice and the symbol is ^{3}
- **Cube roots** is a number when multiplied by itself, equals the given number and symbol is $\sqrt[3]{\ }$

- Find the values of the following:-

(a) $18^3 = 18 \times 18 \times 18 =$ (Ans : 5832)

[1] [8] [SHIFT] [x^2]

(b) $4^3 + 5^2 \times 3^3 =$ (Ans : 739)

(c) $(\frac{3}{7})^3 - \left(\frac{1}{7}\right)^2 =$ (Ans : $\frac{20}{343}$)

(d) $\sqrt[3]{-64} + (-3^2) \times (1\frac{1}{2})^3$ (Ans : - $\frac{275}{8}$)

[SHIFT] [$\sqrt{\blacksquare}$] [(–)] [6] [4] [▶] [+] [(] [(–)] [3] [x^2] [)] [×] [(] [SHIFT] [▭] [1] [▶] [1] [▼] [2] [▶] [)] [SHIFT] [x^2] [=]

(e) $\sqrt{\frac{36}{64}} + \sqrt[3]{8} \times \sqrt[3]{-1\frac{61}{64}} - 8 =$ (Ans :- $\frac{39}{4}$)

(f) $\sqrt{\frac{81}{4} - 4} \times 3^2 + \sqrt[3]{197} =$ (Ans : 42.1)

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F1	Chapter 4/ Bab 4 : Ratio, Rates and Proportions/ Nisbah, Kadar dan kadaran

4.1 Finding the Value of a Quantity
4.2 Finding The Lengths of sides of geometric shapes

1.1 Finding the Value of a Quantity Using Classwiz

1) The ratio of the price of a baju kebaya to the price of a baju kurung is 7 : 4. If the price of the baju kebaya is RM84, find the price of the baju kurung. *Nisbah harga sehelai baju kebaya kepada harga sehelai baju kurung ialah 7 : 4. Jika harga baju kebaya itu ialah RM84, cari harga baju kurung.*

Solution:

X= Harga baju kurung

Baju kebaya : Baju kurung Or 7 : 4 = RM84 : X

7 : 4

RM84 : x

Then , $\frac{X}{4} = \frac{RM84}{7}$

$7 \times X = RM84 \times 4$

$X = 48$

Use Classwizz

Command	Screenshot
Choose Ratio in Menu	
Choose type 2 because 7 : 4 = RM84 : X 2 7 = 4 = 8 4 = =	

Let's try!

Find the value of unknowns below:

1) The ratio of Encik Arif's mass to his son's mass is 3 : 2. If his son's mass is 42 kg, find Encik Arif's mass. *Nisbah jisim Encik arif kepada jisim anaknya ialah 3 : 2. Jika jisim anaknya ialah 42 kg, cari jisim Encik Arif. (Answer :63kg)*

2) Zanariah, Rusita ad Hanifah shared the cost of a birthday present for their mother in the ratio 5 : 3 : 2. Hanifah paid RM50 for the present. Calculate the total amount of money Zanariah and Rusita paid. *Zanariah , Rusita dan Hanifah berkongsi membayar kos hadiah hari jadi ibu mereka mengikut nisbah 5 : 3 : 2. Hanifah membayar RM50 untuk hadiah itu. Hitung Jumlah wang yang dibayar oleh Zanariah dan Rusita. (Answer : RM200*

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F1	**Chapter 6 / Bab 6:** **Linear Equations / Persamaan Linear**

6.1 Linear Equations in one variable / Persamaan Linear dalam Satu Pemboleh Ubah
6.2 Linear Equations in Two Variables / Persamaan Linear dalam Dua Pemboleh Ubah
6.3 Simultaneous Linear Equations in Two Variables / Persamaan Linear Serentak dalam Dua pemboleh Ubah

6.1 Linear Equations in One Variable / Persamaan Linear dalam satu Pemboleh Ubah

- Linear Equations in one unknown are equations which involve numbers and linear algebraic terms in one unknown

- Find the value of unknown below:

1) $5x-7 = 3x+9$ (Ans: 8)

2) $\frac{2m-3}{7} = 3$ (Ans: 12)

3) $5(x-3) + x = -3(1-x)$ (Ans: 4)

4) $\frac{2x-3}{4} = \frac{x+1}{3}$ (Ans: $6\frac{1}{2}$)

Solution

Find the value of unknown below:

1) 5x-7 = 3x+9

Method 1:

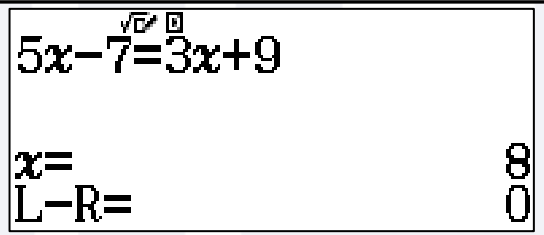
5x-3x =9 + 7

2x = 16

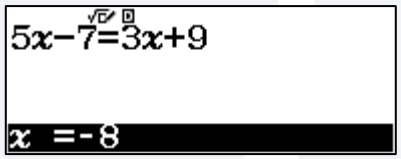
x = 8

Method 2 : Using Classwiz

5x-3x =9 + 7

Command	Screenshot
5 x − 7 ALPHA CALC 3 x + 9 SHIFT CALC = ** Please Remember to press "= " to get final answer	

The x below shows for the previous values of x, if you are not press "=" button



➢ Find the value of unknown below:

1) Given $4x + 3y = 8$, find the value of x when y= -1

$4x + 3(-1)=8$

Then use Classwiz to solve the question

Command	Screenshot
[4] [x] [+] [3] [(] [(-)] [1] [)] [ALPHA] [CALC] [8] [SHIFT] [CALC] [=] ** Please Remember to press "= " to get final answer	$4x+3(-1)=8$ $x=$ 2.75 L−R= 0

Answer: 2.75

2) Given $2x + 4y = 10$, find the value of x when y= 1 (Ans : 3)

3) Given $5x - 10 = y$, find the value of x when y= 20 (Ans : 6)

6.3 Simultaneous Linear Equations in Two Variables / Persamaan Linear Serentak dalam Dua pemboleh Ubah

- Solve the following simultaneous linear equations:

1) $x - y = 6$

$2x - 3y = 22$

Method 1:

$x - y = 6$ .....①

$2x - 3y = 22$ .....②

From ①, $x = 6 + y$ .....③

Substitute ③ into ②,

$2(6 + y) - 3y = 22$

$12 + 2y - 3y = 22$

$2y - 3y = 22 - 12$

$-y = 10$

$y = -10$

Substitute $y = -10$ into ①,

$x - (-10) = 6$

$x + 10 = 6$

$x = -4$

➢ Solve the following simultaneous linear equations by Classwiz

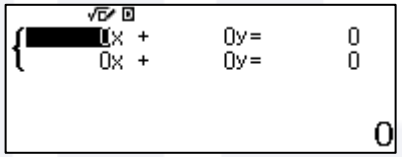
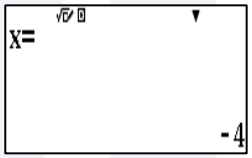
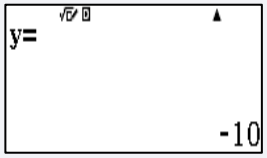
1) $x - y = 6$

$2x - 3y = 22$

Method 2:

$x - y = 6$

$2x - 3y = 22$

Command	Screenshot
1. Choose Equation/Function in Menu	
2. [=] [1] [2]	
3. Key in the coefficients of the unknowns accordingly [1] [=] [(–)] [1] [=] [6] [=] [2] [=] [(–)] [3] [=] [2] [2] [=] [=] Then press "=" button to get y	 

Let's try!

Solve the simultaneous linear equations below:

1) $x - 3y = 7$ and $5x + 2y = 1$

Answer : X = 1 and y= -2

2) $x + 2y = 9$ and $3x - 2y = 15$

Answer : X = 6 and y= $\frac{3}{2}$

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F1	Chapter 12 / Bab 12: Data Handling / Pengendalian Data

12.1 Construct a Pie Chart / Bina Carta Pai
1.2 Finding The Lengths of sides of geometric shapes

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12.1 Construct a Pie Chart / Bina Carta Pai

1) The table shows the favourite songs of a group of children. *Jadual di bawah menunjukkan lagu kegemaran bagi sekumpulan kanak-kanak.*

Favourite song	Rasa Sayang	Ikan Kekek	Bangau oh bangau	Geylang si paku geylang	Lompat si Katak lompat	Dayung sampan
No. of Children	30	40	20	15	10	5

Construct a pie chart to represent the data and justify the appropriateness of the data representation. *Bina satu carta pai untuk mewakili data itu dan justifikasi kesesuaian perwakilan data tersebut.*

12.1 Construct a Pie Chart / Bina Carta Pai

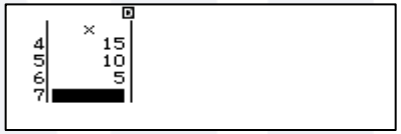
Solution / Jawapan:

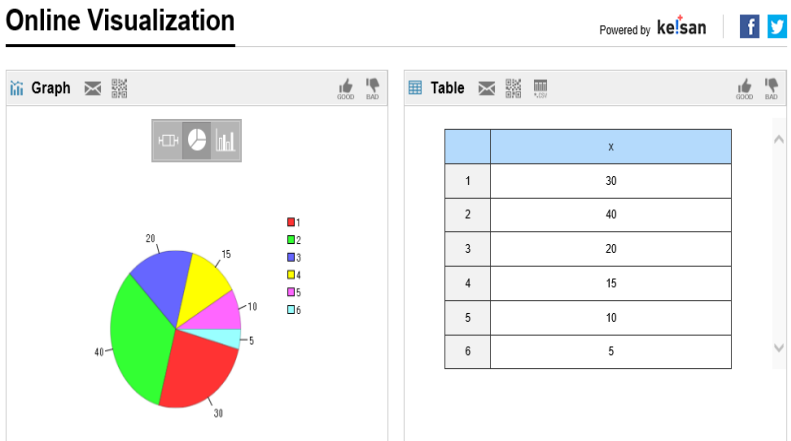
Favourite song	No. of children	Fraction / pecahan	Angle / sudut
Rasa Sayang	30	$\frac{30}{120}$	$\frac{30}{120} \times 360° = 90°$
Ikan Kekek	40	$\frac{40}{120}$	$\frac{40}{120} \times 360° = 120°$
Bangau	20	$\frac{20}{120}$	$\frac{20}{120} \times 360° = 60°$
Geylang	15	$\frac{15}{120}$	$\frac{15}{120} \times 360° = 45°$
Lompat	10	$\frac{10}{120}$	$\frac{10}{120} \times 360° = 30°$
Dayung	5	$\frac{5}{120}$	$\frac{5}{120} \times 360° = 15°$
Total / Jumlah	120	1	$360°$

12.1 Construct a Pie Chart / Bina Carta Pai

Solution / Jawapan:

Check using Classwiz Calculator / Periksa menggunakan Kalkulator Classwiz

Command	Screenshot
1. Press menu and choose statistic / Tekan menu dan pilih statistic	
2. . Choose 1- Variable / Pilih 1-variable 1	
3. Key in data / Masukkan data 3 0 = 4 0 = 2 0 = 1 5 = 1 0 = 5 =	
4. SHIFT OPTN To get the Qr code and scan using Phone to generate pie Chart / untuk mendapatkan kod QR dan scan mengunakan telefon untuk mendapatkan Carta pai	



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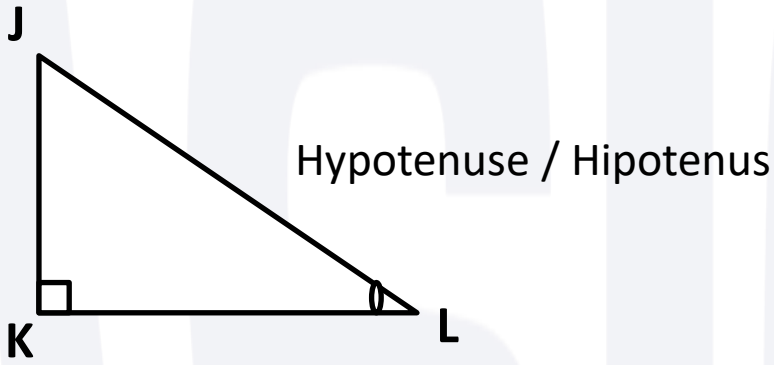
F1	Chapter 13 / Bab 13: Pythagoras' Theorem / Teorem Pythagoras

13.1 Find the hypotenuse / cari hipotenus
13.2 Find the other than hypotenuse / Cari selain daripada hipotenus

Relationship between the sides of a right-angled triangle / Hubungan antara sisi sebuah segi tiga bersudut tegak



- To find hypotenuse / Untuk mencari hipotenus

$$JL^2 = JK^2 + KL^2$$ or using Classwiz Calculator

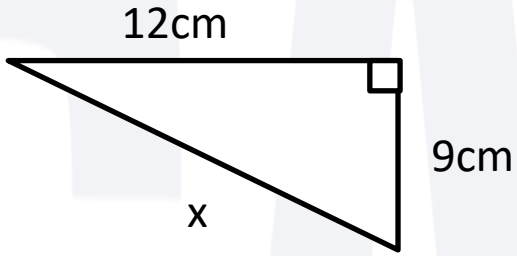
- To find other than hypotenuse/ Untuk mencari selain daripada hipotenus

$$JK^2 = JL^2 - KL^2 \text{ or } KL^2 = JL^2 - JK^2$$

13.1 Find the hypotenuse / Cari hipotenus

- To find the value of x / Cari nilai bagi x

1)



Method 1 / Cara 1: $x^2 = 12^2 + 9^2$

$x^2 = 225$

$x = \sqrt{225}$

x = 15cm

Method 2 / Cara 2: Classwiz Calculator

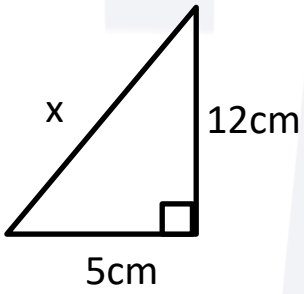
Command	Screenshot
SHIFT + 1 2 SHIFT) 9) =	Pol(12, 9) r=15, θ=36.869897°

x = 15cm

Let's try!

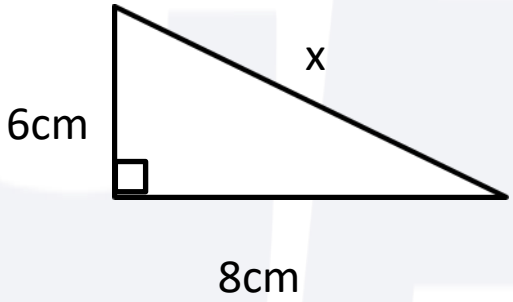
- Find the length of hypotenuse or x using classwiz / Cari panjang hipotenus atau x menggunakan Classwiz..

1)



Ans:13cm

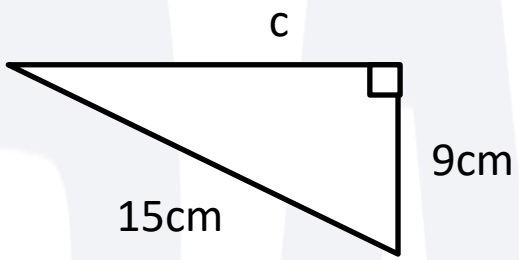
2)



Ans:10cm

13.2 Find the other than hypotenuse / Cari selain daripada hipotenus

1)



Method 1: $c^2 = 15^2 - 9^2$

$c^2 = 144$

$c = \sqrt{144}$

c = 12cm

Method 2 : Classwiz

$15^2 = c^2 + 9^2$

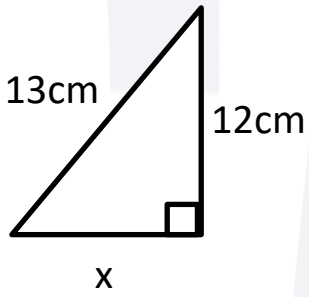
Command	Screenshot
1 5 x^2 ALPHA CALC x x^2 + 9 x^2 SHIFT CALC =	$15^2 = \sqrt{x^2} + 9^2$ $x =$ 12 L−R= 0

c= 12cm

Let's try!

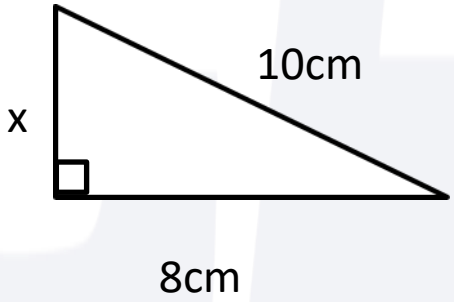
- Find the value of x using Classwiz / Cari nilai bagi x menggunakan Classwiz.

1)



Ans:5cm

2)

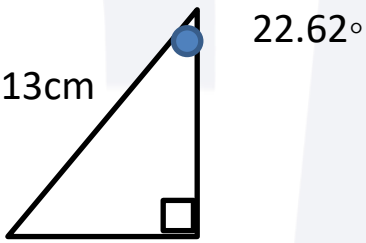


Ans:6cm

EXTRA : Find the other than hypotenuse / Cari selain daripada hipotenus

- Find the length of Adjacent or opposite using Classwiz.

1)



Ans:12cm and 5 cm

Using **Classwiz:**

Command	Screenshot
SHIFT (−) 1 3 SHIFT) 2 2 • 6 2) =	Rec(√13, 22.62) x=11.99998821, y=▸

Remarks

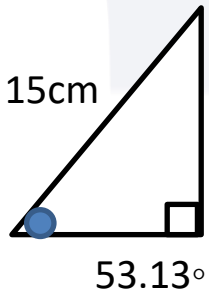
Must have two information:

- Degree
- Hypotenuse

Let's try!

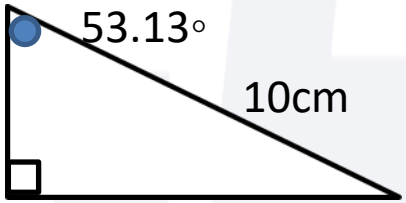
- Find the length of Adjacent or opposite using Classwiz.

1)



Ans:12cm and 9cm

2)



Ans:6cm and 8cm

CASIO

F2	Chapter 8/ Bab 8 : Graphs of Functions / Graf Fungsi

8.1 Calculate the values of x and y / Mengira nilai x dan y
8.2 Generate graph from Classwiz / Keluarkan Graf dari Classwiz

Boost your Curiosity

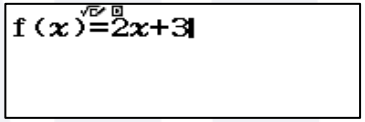
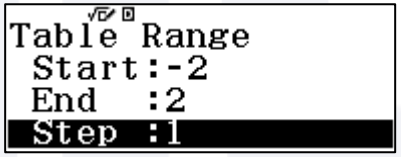
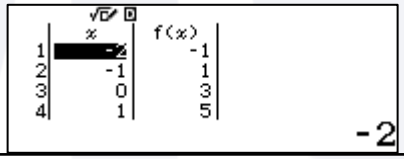
8.1 Calculate the values of x and y / Mengira nilai x dan y

- Find the value of y for / Cari nilai y bagi:

$y = 2x + 3$ when $-2 \leq x \leq 2$

x	-2	-1	0	1	2
y					

Using Classwiz / Menggunakan Classwiz

Command	Screenshot
1. Press menu and choose table / Tekan menu dan cari Table	
2. Key in function / Masukkan Fungsi	
3. [=] [=] Fill up for x value as below / Isi kan nilai x seperti di bawah start: -2 End : 2 Step :1	
4. [=] to get the value of y / untuk mendapatkan nilai y	

8.2 Generate graph from Classwiz / Keluarkan Graf dari Classwiz

➢ Continue from previous slide / bersambung dari slide sebelumnya

Command	Screenshot
SHIFT OPTN Then use scanner to get the graph / Gunakan scanner untuk dapatkan graf.	

Let's try!

➢ Draw the graph of y = $x^2 - x$ for $-3 \leq x \leq 3$

Answer:

x	-3	-2	-1	0	1	2	3
y	12	6	2	0	0	2	6

EXTRA : Calculate the value of x and y (Two graphs)

- Complete the table below

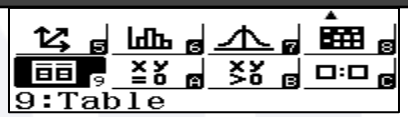
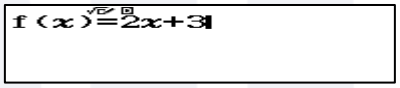
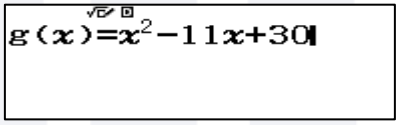
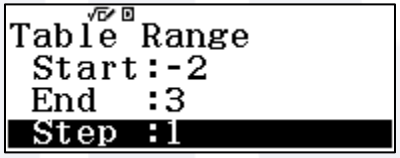
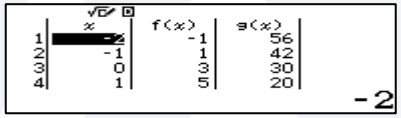
f(x) = 2x + 3 when $-2 \leq x \leq 2$

x	-2	-1	0	1	2
y					

g(x)= $x^2 - 11x + 30$ when $-1 \leq x \leq 3$

x	-1	0	1	2	3
y					

Using Classwiz

Command	Screenshot
1. Press menu and choose table / Tekan menu dan pilih table	
2. Key in function f(x) / Masukkan fungsi f(x)	
3. Press [=] and key in function g(x) . Then, [=] Masukkan fungsi g(x)	
4. Fill up table range / Isi jadual di bawah Start: -2 (smallest number for both table) End : 3 (biggest number for both table) Step : 1 (smallest difference value of x)	
4. Press [=] to get the value of y	

CASIO®

F2	Chapter 12 / Bab 12: Measures of Central Tendency / Sukatan kecenderungan memusat

12.1 Median and mean without Frequency table / Median dan min tanpa jadual kekerapan
12.2 Median and Mean with Frequency Table / Median dan Min dengan jadual kekerapan
12. 3 12. 3 Mean of a Set of Grouped Data/ Min bagi Data Terkumpul

1) Find the median and mean for 28, 27, 21, 23, 24, 21, 25, 24

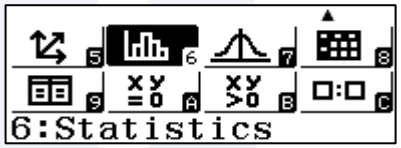
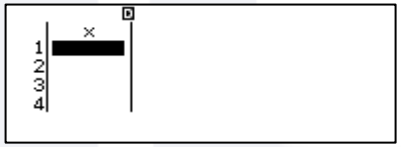
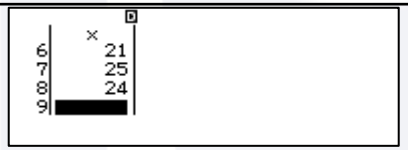
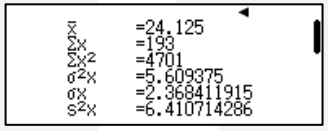
Cari median dan min bagi 28, 27, 21, 23, 24, 21, 25, 24

Arrang in ascending order / Susun dalam urutan menaik : **21, 21, 23, 24, 24, 25, 27, 28**

Median : $\frac{24+24}{2} = 24$

Mean : $\frac{28 + 27 + 21 + 23 + 24 + 21 + 25 + 24}{8}$ **= 24.125**

- Check using Calculator Classwiz / Periksa menggunakan Kalkulator Classwiz

Command	Screenshot
Press Menu and choose statistic / Tekan menu dan pilih Statistic [=]	
Press [1] to choose 1-Variable Pilih 1-Variable	
Key in all the data / Masukkan semua data [2] [8] [=] [2] [7] [=] [2] [1] [=] [2] [3] [=] [2] [4] [=] [2] [1] [=] [2] [5] [=] [2] [4] [=]	
To get mean and median / Untuk mendapatkan mean dan median. [OPTN] [3]	

13. 1 Let's Try!

Find the median and mean below.

Cari median dan min di bawah.

1) 76, 25, 42, 63, 84, 55

Answer / Jawapan :
Median – 59
Mean / min – 57.5

2) 6, 15, 7, 13, 9, 11, 9

Answer / Jawapan :
Median – 9
Mean / min - 10

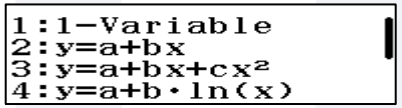
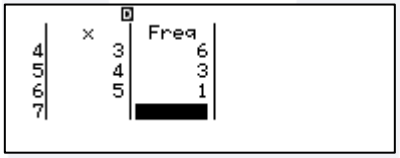
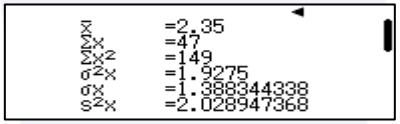
3) 5, 3, 8, 2, 6, 3, 4

Answer / Jawapan :
Median – 4
Mean / min – 4.43

12.2 Median and Mean with Frequency Table / Median dan Min dengan jadual kekerapan

1) Find the median and mean below. *Cari median dan min di bawah*.

Score	0	1	2	3	4	5
Frequency	3	2	5	6	3	1

Command	Screenshot
Press Menu and choose statistic	
Press 1 to choose 1-Variable	
On frequency column SHIFT MENU 3 1	
Key in all data 0 = 1 = 2 = 3 = 4 = 5 = ▲ ▲ ▲ ▲ ▲ ▲ ▶ 3 = 2 = 5 = 6 = 3 = 1 =	
Press OPTN 3 to get mean and median	

Median – 2.5 Mean / min – 2.35

Let's Try!

Find the median and mean below. *Cari median dan min di bawah*.

1)

Internet usage (Hours) Penggunaan internet (Jam)	1	2	3	4	5
No. of Students Bil. Pelajar	2	6	11	7	9

Answer / Jawapan:

Median – 3

Mean / Min

2)

Time (minutes) Masa (minit)	10	20	30	40
Frequency Kekerapan	2	4	5	1

Answer / Jawapan:

Median – 25

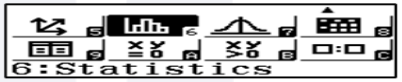
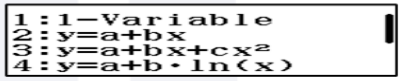
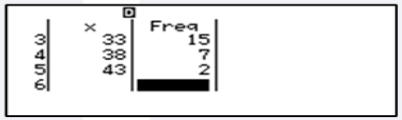
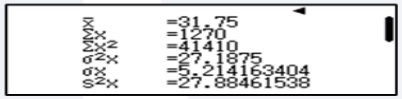
Mean / Min -24.17

12.3 Mean of a Set of Grouped Data/ Min bagi Data Terkumpul

Time(s)	Frequency
21-25	5
26-30	11
31-35	15
36-40	7
41-45	2

The table shows the times taken by a grouped of students to complete a task. Find the mean of the data

Remember
x – Midpoint / Titik Tengah
$\sum x$ – Frequency x midpoint / Kekerapan x Titik tengah
$\sum x^2$- fx^2
$\sigma^2 x$ – Variance / Varian
σx – Standard deviation / sisihan piawai

Command	Screenshot
Converts 'Menu' to 'Statistics'	
Choose 1: 1-Variable	
On Frequency Column SHIFT MENU ▼ 3 1	
Key in x: midpoint / Titik tengah 2 3 = 2 8 = 3 3 = 3 8 = 4 3 = f: frequency / Kekerapan 2 3 = 2 8 = 3 3 = 3 8 = 4 3 =	
To get Mean / untuk mendapatkan min OPTN 3	

Let's Try!

Find the mean of the data below

1)

Number of Newspaper Bil. Surat khabar	No. of stores (Frequency) Bil. Kedai (Kekerapan)
70 – 74	4
75 – 79	10
80 – 84	8
85 – 89	2

Answer / Jawapan:

Mean / min – 78.67

CASIO®

F3	Chapter 1 / Bab 1: Indices / Indeks

1.1 Computations involving Laws of indices / Pengiraan melibatkan Hukum Indeks
1.2 Find the value of x / Cari nilai x

Boost your Curiosity

1.1 Computations involving Laws of indices / Pengiraan melibatkan Hukum Indeks

➢ Solve the question below / selesaikan soalan di bawah

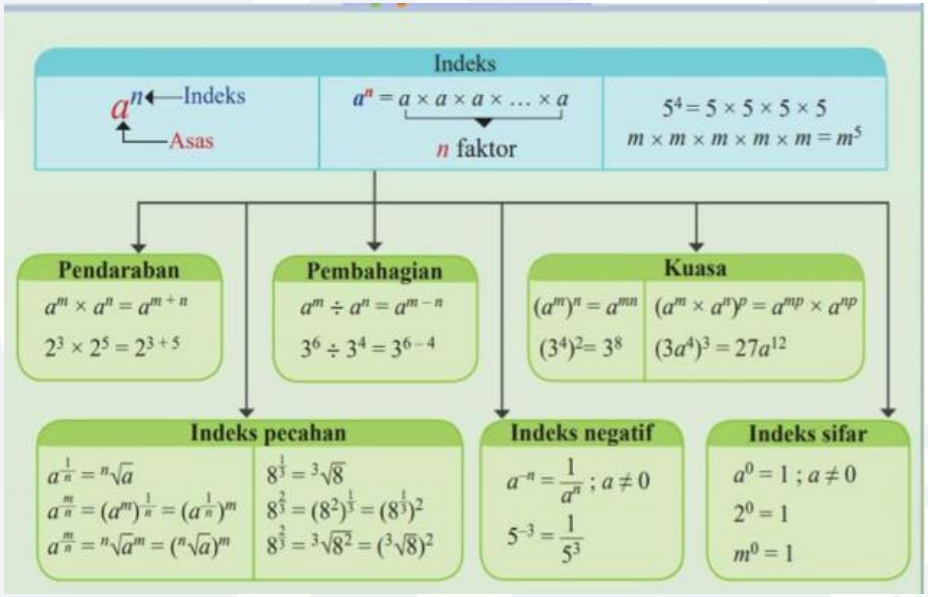
1) $125^{\frac{-2}{3}}$ (Ans: $\frac{1}{25}$)

Command	Screenshot
1 2 5 $x^{\square}$ $\frac{\square}{\square}$ (−) 2 ▼ 3 =	$125^{\frac{-2}{3}} = \frac{1}{25}$

2) $4^{\frac{1}{3}} \times 50^{\frac{2}{3}} \times 10^{\frac{5}{3}}$ (Ans: 1000)

3) $5^{\frac{5}{2}} \times 20^{\frac{3}{2}} \div 10^{-2}$ (Ans: 500 000)

4) $60^{\frac{1}{2}} \times 125^{\frac{2}{3}} \div \sqrt{15}$ (Ans: 50)



1.2 Find the value of x / Cari nilai x

Calculate the value of x / Hitung nilai x

1) $64x^{\frac{1}{2}} = 27x^{\frac{-5}{2}}$ (Ans: $\frac{3}{4}$)

Command	Screenshot
6 4 x $x^{\blacksquare}$ 1 ▤ 2 ▶ ▶ ALPHA CALC 2 7 x $x^{\blacksquare}$ (−) 5 ▤ 2 SHIFT CALC =	$64x^{\frac{1}{2}}=27x^{-\frac{5}{2}}$ $x=$ 0.75 L−R= 0

2) $3x^{\frac{2}{3}} = \frac{27}{4}x^{\frac{-4}{3}}$ (Ans: $\frac{3}{2}$)

3) $2^{x^2} \times 2^{6x} = 2^7$ [IMPORTANT] (Ans: 1, -7)

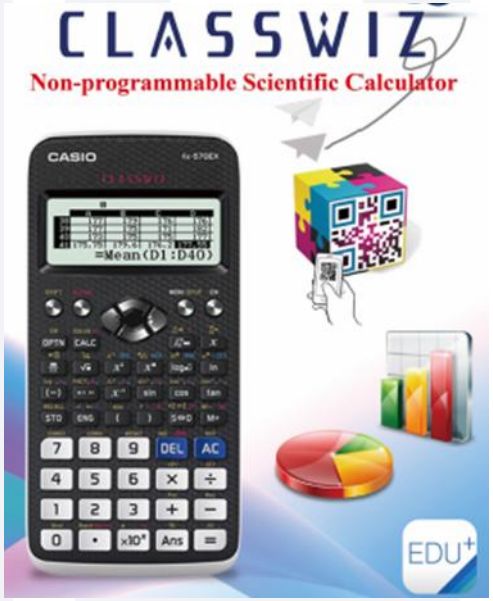
4) $25^x - 5^{3x-4} = 0$ [Important] (Ans:4)

4)$5^{x^2} \div 5^{3x} = 625$ (Ans :-1, 4)

CASIO

F3	Chapter 2 / Bab 2: Standard Form / Bentuk piawai

2.1 Significant Figures / Angka beerti
2.2 Standard Form / Bentuk Piawai



2.1 Significant Figures / Angka beerti

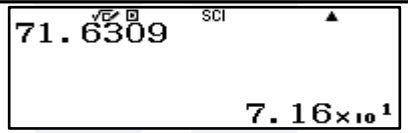
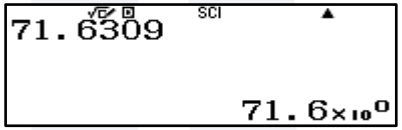
➢ **Classwiz**

To round off a number correct to n significant figures go to . *Untuk bundarkan kepada angka beerti pergi kepada*

Setup → Number Format → Sci.

Example:-

(a) 71.6309 (3 sig. fig)

Command	Screenshot
SHIFT MENU 3 2 3 7 1 • 6 3 0 9 =	
Click ENG to change the decimal point	

(b) 8007 (2 sig. fig) (Ans: 8000)

(c) 0.0805 (2 sig. fig) (Ans: 0.081))

(d) 23.15 (2 sig. fig) (Ans: 23)

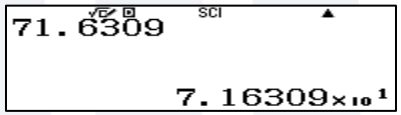
(e) 0.0003245(3 sig. fig) (Ans:0.000325)

2.2 Standard Form / Bentuk Piawai

A x 10^n, where 1 ≤ A < 10 and n is an integer.

Convert the numbers below to a standard form / Tukarkan kepada bentuk piawai

(a) 71.6309 (Ans: 7.16309 x 10^1)

Command	Screenshot
7 1 • 6 3 0 9 = SHIFT MENU 3 2 6 =	

(b) 8007 (Ans: 8.007 x 10^3)

(c) 0.0805 (Ans: 8.05 x 10^{-2})

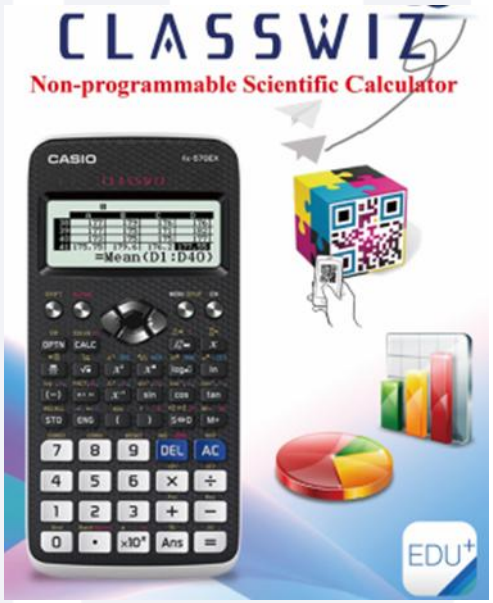
(d) 23.15 (Ans: 2.315 x 10^1)

(e) 0.0003245 (Ans:3.245 x 10^{-4})

CASIO

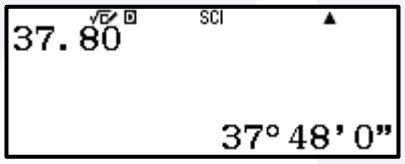
F3	Chapter 5 / Bab 5: Trigonometric Ratios / Nisbah Trigonometri

5.1 Convert the measurements of angles / Menukar Ukuran Sudut
5.2 Find the value of angles / Cari Nilai Sudut
5.3 Find the Length of Side / Cari Panjang Sisi



5.1 Convert the measurements of angles / Menukar Ukuran Sudut

1) Converting from degrees to degrees and minutes. *Tukarkan daripada darjah ke darjah dan minit*



a) 37.80° [3] [7] [•] [8] [0] [=] [°,,,]

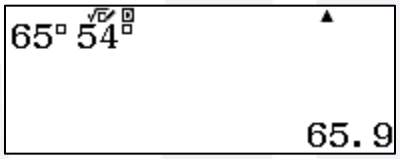
b) 16.9° (Ans : 16°54′)

c) 58.1° (Ans : 58°6′)

d) 60.2° (Ans : 60°12′)

e) 72.3° (Ans : 72°18′)

2) Converting from degrees and minutes to degrees. *Tukarkan daripada darjah dan minit ke darjah*



a) 65°54′ [6] [5] [°,,,] [5] [4] [°,,,] [=] [°,,,]

b) 36°36′ (Ans : 36.6°)

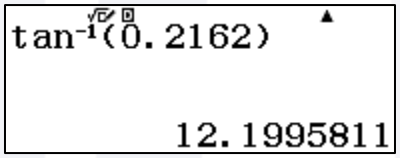
c) 69°24′ (Ans : 69.4°)

d) 35°30′ (Ans : 35.5°)

e) 70°6′ (Ans : 70.1°)

Calculate the x values by using scientific calculator. *Hitungkan nilai x menggunkan saintifik kalkulator.*

1) $\tan x = 0.2162$ SHIFT tan 0 • 2 1 6 2) =



2) $\cos x = 0.5878$ (Ans : 54°)

3) $\sin x = 0.4062$ (Ans : 24°)

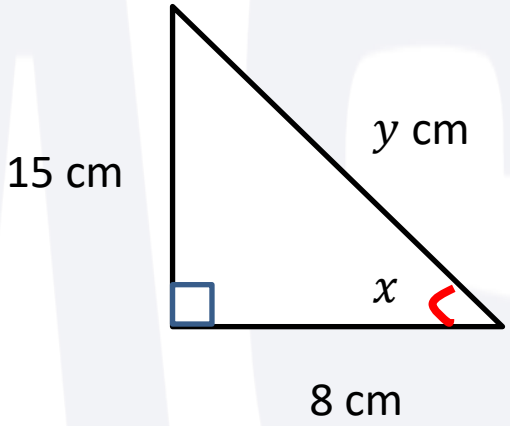
4) $\sin x = 0.9121$ (Ans : 65.8°)

5) $\cos x = 0.9686$ (Ans : 14.4°)

5.3 Find the Length of Side / Cari Panjang Sisi

Calculate the x and y values by using scientific calculator. *Hitungkan nilai x dan y menggunkan saintifik kalkulator.*

Solution:



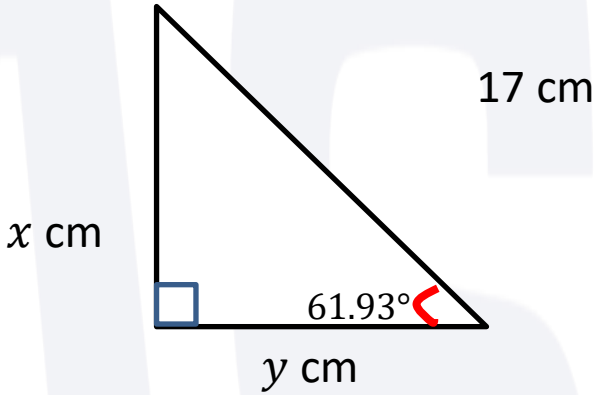
Command	Screenshot
SHIFT + 8 SHIFT) 1 5) =	Pol(8, 15) r=17, θ=61.927513(

$y = 17\ cm$
$x = 61.93°$

5.3 Find the Length of Side / Cari Panjang Sisi

Calculate the x and y values by using scientific calculator. *Hitungkan nilai x dan y menggunkan saintifik kalkulator.*

Solution:



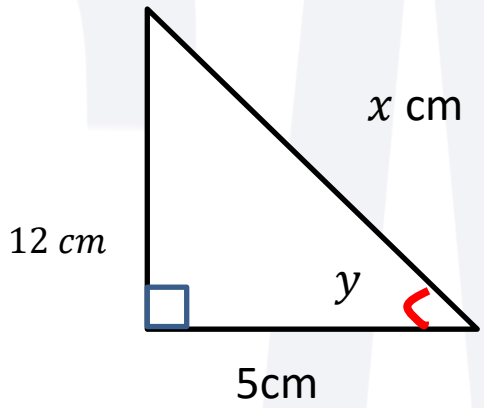
Command	Screenshot
SHIFT (−) 1 7 SHIFT) 6 1 • 9 3) =	Rec(17, 61.93) x=7.999348914, y=▶ Rec(17, 61.93) ◀14, y=15.00034723

$y = 8\ cm$
$x = 15\ \text{cm}$

Let's Try!

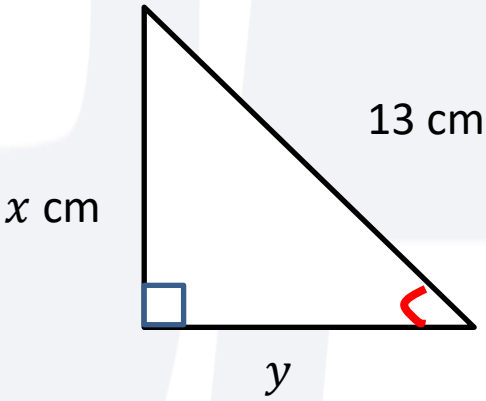
Calculate the x and y values by using scientific calculator. *Hitungkan nilai x dan y menggunkan saintifik kalkulator.*

1)



(x= 13 cm , y =67.38°)

2)



(x= 12 cm , y =5cm)

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F4	**Chapter 1/ Bab 1:** **Quadratic Functions and Equations in One Variable** **Fungsi dan Persamaan Kuadratik dalam Satu Pemboleh Ubah**

1.1 Find the Roots of a Quadratic Equations / Cari Punca bagi Persamaan Kuadratik
1.2 Maximum and Minimum Points of Quadratic Functions / Titik Maksimum dan Minimum bagi Persamaan Kuadratik

Make sure the quadratic equation in general form

Pastikan Persamaan kuadratuk dalam bentuk am

$$\boldsymbol{ax^2 + bx + c = 0}$$

Example:-

(a) $x^2 - 11x + 30 = 0$

(b) $2x^2 - x - 3 = 0$

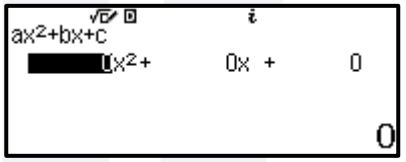
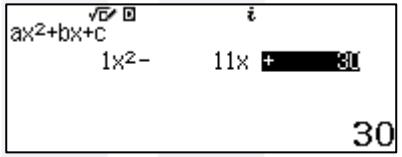
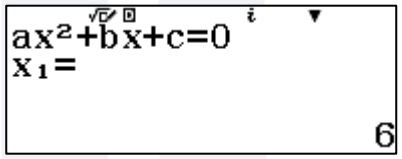
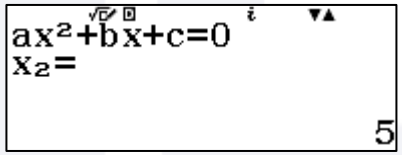
(c) $t^2 - 10t - 144 = 0$

(d) $x(x - 2) = 3x - 4$

Solution

Example:-

(a) $x^2 - 11x + 30 = 0$

Command	Screenshot
Converts 'Menu' to 'Equation/ Function'. Choose 'Polynomial' and key in highest degree of unknown. *Tukar 'Menu' kepada 'Equation / Function' . Pilih ' Polynomial' dan masukkan kuasa tertinggi bagi pemboleh ubah*	
Key in the coefficient of the equation. / Masukkan pekali bagi persamaan 1 = (−) 1 1 = 3 0 =	
Obtain the value of x_1 by pressing = Dapatkan nilai x_1 dengan tekan =	
Obtain the value of x_2 by pressing = Dapatkan nilai x_2 dengan tekan =	
Get the graph through QR code / Dapatkan graf melalui QR Code SHIFT OPTN	

Let's try!

Example:-

(a) $x^2 - 11x + 30 = 0$ (Ans: $x_1 = 6$, $x_2 = 5$)

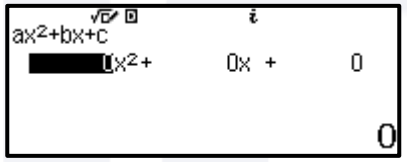
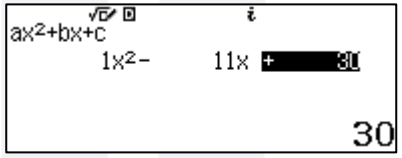
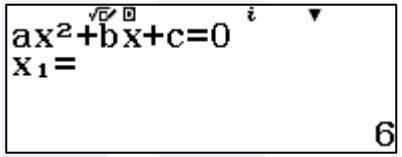
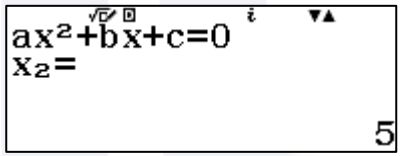
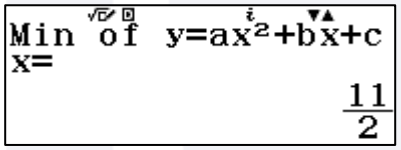
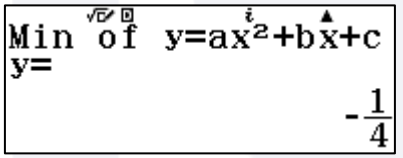
(b) $2x^2 - x - 3 = 0$ (Ans: $x_1 = \frac{3}{2}$, $x_2 = -1$)

(c) $t^2 - 10t - 144 = 0$ (Ans: $x_1 = 18$, $x_2 = -8$)

(d) $x(x - 2) = 3x - 4$ (Ans: $x_1 = 4$, $x_2 = 1$)

1.2 Maximum and Minimum Points of Quadratic Functions / Titik Maksimum dan Minimum bagi Persamaan Kuadratik

➢ Example: $x^2 - 11x + 30 = 0$

Command	Screenshot
Converts 'Menu' to 'Equation/ Function'. Choose 'Polynomial' and key in highest degree of unknown. *Tukar 'Menu' kepada 'Equation / Function' . Pilih ' Polynomia' dan masukkan kuasa tertinggi bagi pemboleh ubah*	
Key in the coefficient of the equation. / Masukkan pekali bagi persamaan 1 = (−) 1 1 = 3 0 =	
Obtain the value of x_1 by pressing = Dapatkan nilai x_1 dengan tekan =	
Obtain the value of x_2 by pressing = Dapatkan nilai x_2 dengan tekan =	
Obtain the min point of x by pressing = Dapatkan titik min x dengan tekan =	
Obtain the min point of y by pressing = Dapatkan titik min y dengan tekan =	

Let's try!

Example:-

(a) $x^2 - 11x + 30 = 0$ (Ans: $x = \frac{11}{2}$, $y = -\frac{1}{4}$)

(b) $2x^2 - x - 3 = 0$ (Ans: $x = \frac{1}{4}$, $y = -\frac{25}{8}$)

(c) $t^2 - 10t - 144 = 0$ (Ans: $x = 5$, $y = -169$)

CASIO®

F4	Chapter 2 / Bab 2: Number Bases / Asas Nombor

2.1 Numbers in Bases Two, Eight and Ten / Nombor dalam Asas dua, lapan dan sepuluh
2.2 Computation involving addition and subtraction/ Pengiraan melibatkan operasi tambah dan tolak

2.1 Numbers in Bases Two, Eight and Ten / Nombor dalam Asas dua, lapan dan sepuluh

- Convert each of the following numbers in a base stated / *Tukarkan setiap nombor kepada asas yang dinyatakan*

(a) 1001_2 (Base ten)
(b) 167_8 (Base ten)
(c) 19_{10} (Base two)
(d) 64_{10} (Base two)
(e) 777_{10} (Base eight)
(f) 110101_2(Base eight)

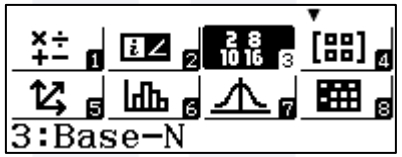
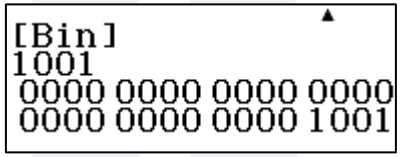
Answer:-
(a)9_{10}
(b) 119_{10}
(c) 10011_2
(d) 1000000_2
(e) 1411_8
(f) 65_8

Base Ten	• Decimal • Dec
Base Eight	• Octal • Oct
Base Two	• Binary • Bin

Solution

➢ **Classwiz**

(a) 1001_2 (Base ten)

Command	Screenshot
Choose 'Base-N' in Menu Pilih ' Base-N' dalam Menu	
log 1 0 0 1 =	
Click x^2 or Dec to change in base ten Tekan x^2 atau DEC untuk tukar kepada asas sepuluh	

Hence, the answer is $\mathbf{9_{10}}$

2.2 Computation involving addition and subtraction/ Pengiraan melibatkan operasi tambah dan tolak

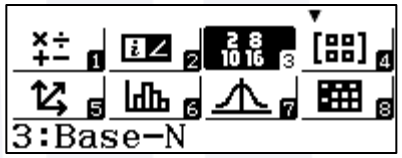
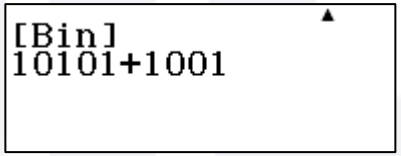
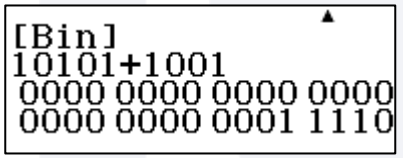
- Calculate the value of the following / Hitungkan nilai berikut

(a) $10101_2 + 1001_2$ = (Ans: 11110_2)

(b) $1767_8 - 673_8 =$ (Ans:1074_8)

(c) $1359_{10} + 971_{10} =$ (Ans:2330_{10})

(d) $110101_2 - 111_2 =$ (Ans:101110_2)

Command	Screenshot
Choose 'Base-N' in Menu Pilih ' Base-N' dalam Menu	
log 1 0 1 0 1 + 1 0 0 1	
Press = to get the answer Tekan = untuk dapatkan jawapan	

CASIO

F4	Chapter 8/ Bab 8 : Measures of Dispersion for Ungrouped Data/ Sukatan Serakan bagi Data Tak Terkumpul

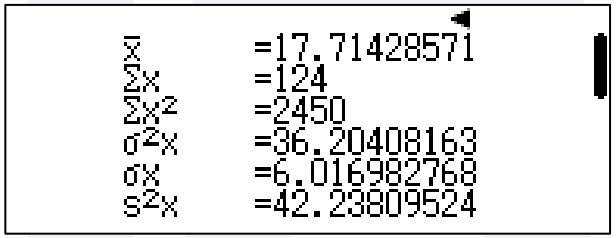
8.1 Without Frequency / Tanpa Kekerapan
8.2 With Frequency / Dengan Kekerapan

Boost your Curiosity

8.1 Without Kekerapan / Tanpa Kekerapan

- Find the range, interquartile range , Standard deviation and variance. *Cari julat, julat kuartile, sisihan piawai dan varian*
- **Example:-**

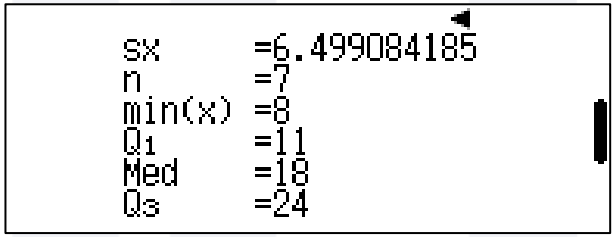
1) 8, 25, 16, 11, 24, 18, 22



Solution:

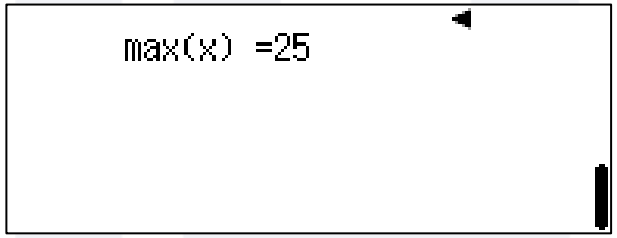
Rearrange in ascending / susun secara menaik :

8, 11, 16, 18, 22, 24, 25



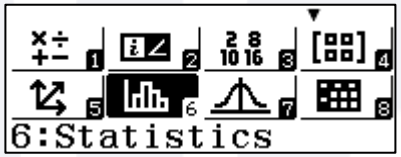
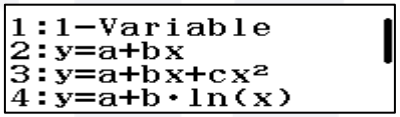
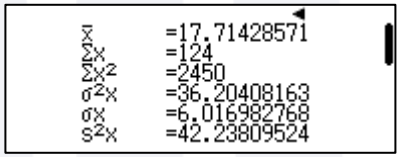
- **Range / Julat:** Max – Min = 25 – 8 =17
- **Interquartile range / Julat kuartile :** $Q_3 - Q_1$ = 24- 11 = 13
- **Standard deviation/ Sisihan Piawai** :$\sigma = \sqrt{\frac{\sum x^2}{N} - \bar{x}^2}$

$$:\sigma = \sqrt{\frac{\sum x^2}{N} - \bar{x}^2} = \sqrt{\frac{2450}{7} - 17.7143^2} = 6.017$$



- **Variance/ Varian** : $\sigma^2 = \frac{\sum x^2}{N} - \bar{x}^2 = \frac{2450}{7} - 17.7143^2$ =36.204

Solve using Classwiz

Command	Screenshot
Converts 'Menu' to 'Statistics' Tukarkan 'Menu' kepada 'Statistics'	
Choose 1: 1-Variable Pilih 1:1- Variable	
Key in all the values of data / Masukkan semua data 8 = 2 5 = 1 6 = 1 1 = 2 4 = 1 8 = 2 2 =	
To get the information / Dapatkan maklumat OPTN 3	

Remember

x - midpoint

$\sum x$ - Total Frequency

$\sum x^2$ – Frequency^2

$\sigma^2 x$ - Variance

σx – Standard Deviation

Let's try!

1) 27, 33, 45, 18, 62, 50

Ans:

Range / Julat = 62- 18 = 44

Range interquartile / Julat kuartil= 50 – 27= 23

Standard deviation / sisihan piawai =14.758

Variances / Varian= 217.806

2) 3.4, 2.8, 2.7, 4.3, 3.8, 3.2, 3.0, 2.9

Ans:

Range / Julat= 4.3 – 2.7 = 1.6

Range interquartile / Julat kuartil = 3.6 -2.85 = 0.75

Standard deviation / sisihan piawai = 0.515

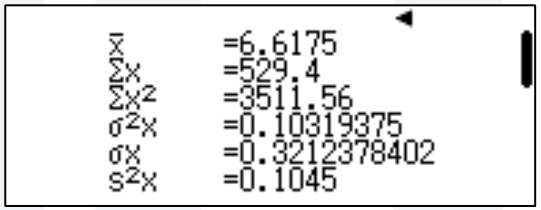
Variances / Varian= 0.265

8.2 With Kekerapan / Dengan Kekerapan

- Find the range, interquartile range , Standard deviation and variance. *Cari julat, julat kuartile, sisihan piawai dan varian*
- **Example:-**

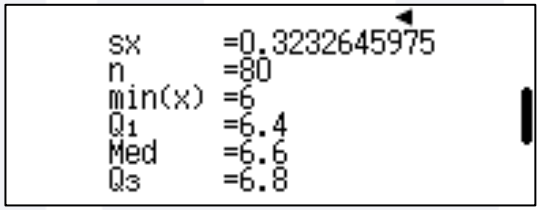
Diameter (cm)	6.0	6.2	6.4	6.6	6.8	7.0	7.2
No. of Orange Bil. Limau	6	9	12	18	20	10	5

Solution:

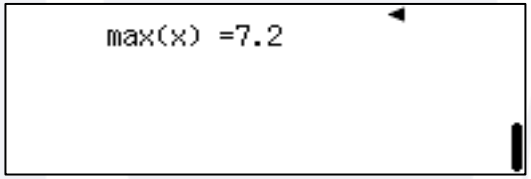


- **Range / Julat:** Max – Min = 7.2 – 6.0 =1.2
- **Interquartile range / Julat kuartile :** $Q_3 - Q_1$ = 6.8- 6.4 = 0.4
- **Standard deviation/ Sisihan Piawai** :$\sigma = \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2}$

$$:\sigma = \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2} = \sqrt{\frac{3511.56}{80} - 6.6175^2} = 0.321$$



- **Variance/ Varian** : $\sigma^2 = \frac{\sum fx^2}{\sum f} - \bar{x}^2 = \frac{3511.56}{80} - 6.6175^2 = 0.103$



Let's try!

1)

Age (Year)	13	14	15	16	17	18
No. of Participants	12	18	21	20	21	8

Ans:

Range / Julat = 18- 13 = 5

Range interquartile / Julat kuartil= 17-14 = 3

Standard deviation / sisihan piawai =1.492

Variances / Varian= 2.226

8.2 Kekerapan / Kekerapan

Cari nilai y jika $\sum fx^2 = 1321$
Find the value of y if $\sum fx^2 = 1321$

Score	2	4	5	6	y	9
Frequency	5	3	2	5	6	9

CASIO®

F4	**Chapter 2/ Bab 2:** **Quadratic Functions / Fungsi Kuadratik**

2.1 Solving a Quadratic Equations / Menyelesaikan Persamaan Kuadratik
2.2 Solving a quadratic inequalities/ Menyelesaikan Ketaksamaan Kuadratik

2.1 Solving a Quadratic Equations / Menyelesaikan Persamaan Kuadratik

Methods to solve quadratic equations. *Kaedah untuk selesaikan persamaan kuadratik*.

- Factorisation / Pemfaktoran
- Completing the Square / Penyempurnaan kuasa dua
- Formula/ Rumus $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Example:-

(a) $x^2 + 4x - 9 = 0$ (Ans: -5.606 , 1.606)

(b) $x^2 - 3x - 5 = 0$ (Ans: -1.193, 4.193)

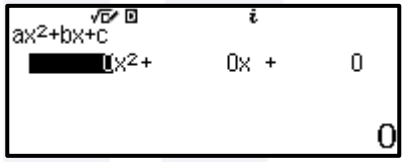
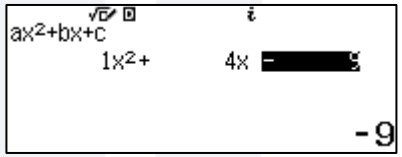
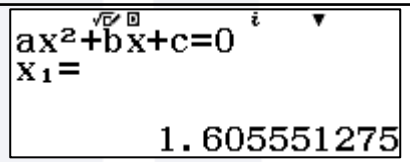
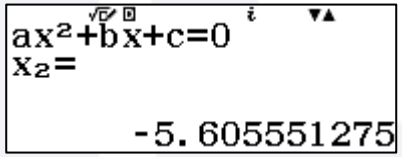
(c) $-x^2 - 6x + 9 = 0$ (Ans: -7.243, 1.243)

(d) $4x^2 - 8x + 1 = 0$ (Ans: 0.134, 1.866

Solution

Example:-

(a)$x^2 + 4x - 9 = 0$

Command	Screenshot
Converts 'Menu' to 'Equation/ Function'. Choose 'Polynomial' and key in highest degree of unknown. *Tukar 'Menu' kepada 'Equation / Function' . Pilih ' Polynomia' dan masukkan kuasa tertinggi bagi pemboleh ubah*	
Key in the coefficient of the equation. / Masukkan pekali bagi persamaan 1 = 4 = (−) 9 =	
Obtain the value of x_1 by pressing = S⇔D Dapatkan nilai x_1 dengan tekan = S⇔D	
Obtain the value of x_2 by pressing = S⇔D Dapatkan nilai x_2 dengan tekan = S⇔D	

(Ans: -5.606 , 1.606)

2.2 Solving a quadratic inequalities/ Menyelesaikan Ketaksamaan Kuadratik

Methods to solve quadratic inequalities. *Kaedah untuk selesaikan ketaksamaan kuadratik*.

- Graph sketching method / Kaedah lakaran graf
- Number line method / kaedah garis nombor
- Table method/ Kaedah jadual

Example:

(a) $x^2 < 4$ (Ans: $-2 < x < 2$)

(b) $(2 - x)(8 - x) < 0$ (Ans: $2 < x < 8$)

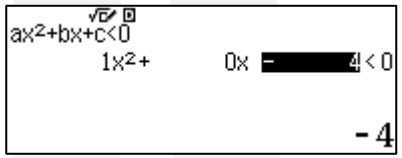
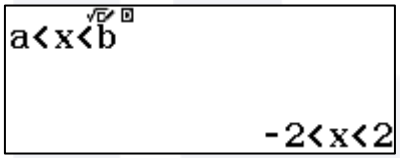
(c) $x^2 \leq 4x + 12$ (Ans: $-2 \leq x \leq 6$)

(d) $x(x - 2) \geq 3$ (Ans:-$x \leq -1$ $x \geq 3$)

Checking

➢ Find the range of values of x which satisfies the inequality

(a)$x^2 < 4$

Command	Screenshot
Converts 'Menu' to 'Inequality' . Choose 'Polynomial' and key in highest degree of unknown. [=] [2] *Tukar 'Menu' kepada 'Inequality'. Pilih 'Polynomial' dan madukkan kuasa tertinggi.* [=] [2]	
Choose the type of inequality. Pilih jenis ketaksamaan [2]	
Key in the coefficient of inequality . *Masukkan pekali* [1] [=] [0] [=] [(−)] [4] [=]	
Obtain the range of x by pressing. Dapatkan julat dengan menekan [=]	
Get the graph through QR code / Dapatkan graf melalui QR Code [SHIFT] [OPTN]	

(Ans: $-2 < x < 2$)

CASIO®

F4	**Chapter 3 / Bab 3:** **System of Equations / Sistem Persamaan**

3.1 System of Linear Equations in Three Variables / Sistem Persamaan Linear dalam Tiga Pemboleh Ubah
3.2 Simultaneous Equations Involving One Linear Equation and One Non-Linear Equation / Persamaan Serentak Melibatkan Satu Persamaan Linear dan Satu Persamaan Tak Linear

➢ Example

(a) $x - 4y - 2z = -1$

$x + y + 3z = -6$

$x + 2y - z = -4$ **(Ans : $x = -\frac{19}{5}$, $y = -\frac{2}{5}$, $z = -\frac{3}{5}$)**

(b) $-3x + y - 4 = 14$

$x + 6y - z = 2$

$2x - y + 3z = 10$ **(Ans : $x = -\frac{235}{2}$, $y = \frac{71}{2}$, $z = \frac{187}{2}$)**

(c) $x + 2y + z = 3$

$2x - y + 3z = 13$

$2x + 3y + 4z = 11$ **(Ans : $x = 2$, $y = -1$, $z = 2$)**

Solution / working calculation

- Solve the simultaneous equations below:-

(a) $2x + 8y + 4z = 2$ ---------- ① ② ③ ④ ⑤ ⑥

$2x - 2y - 6z = 12$ ---------- ②

$2x + 4y + 2z = 8$ --------- ③

Eliminate x from ① and ② : ① - ②

$$2x + 8y + 4z = 2$$
$$(-) \quad 2x - 2y - 6z = 12$$
$$10y + 10z = -10 \qquad \text{------- } ④$$

Eliminate x from ① and ③ : ① - ③

$$2x + 8y + 4z = 2$$
$$(-) \quad 2x + 4y + 2z = 8$$
$$4y + 2z = -6 \qquad \text{-------- } ⑤$$

Solution / working calculation

Eliminate z from ④ and ⑤

⑤ x 5 $\quad 20y + 10z = -30 \quad$ -------- ⑥

⑥- ④ $\quad 20y + 10z = -30$

(-) $\quad 10y + 10z = -10$

$10y = -20$

$y = -2$

Substitute $y = -2$ into ⑤ $\quad 4(-2) + 2z = -6$

$z = 1$

Substitute $y = -2$ and $z = 1$ into ① $\quad 2x + 8(-2) + 4(1) = 2$

$x = 7$

Thus, $x = 7$, $y = -2$ and $z = 1$

Solution using Classwiz

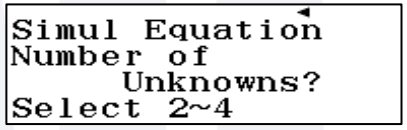
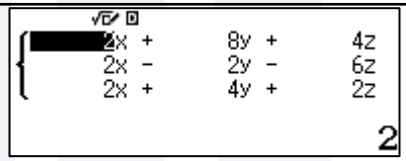
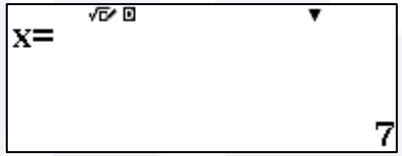
➢ Solve the simultaneous equations below:-

(a) $2x + 8y + 4z = 2$

$2x - 2y - 6z = 12$

$2x + 4y + 2z = 8$

Double check answer :

Command	Screenshot
Choose 'Equation/ Function' in Menu Pilik 'Equation/ Function' di Menu	
Press 1 for simul Equation and select 3 unknowns Pilih 1: simul Equation dan pilih 3 pemboleh ubah	
Key in all the coefficient of the equations Masukkan semua pekali bagi persamaan	
Press to get the value of x, y and z Tekan untuk dapatkan nilai x, y dan z	

Thus, $x = 7$, $y = -2$, $z = 1$

3.2 Simultaneous Equations Involving One Linear Equation and One Non-Linear Equation / Persamaan Serentak Melibatkan Satu Persamaan Linear dan Satu Persamaan Tak Linear

➢ **Example**

$2x + y = 11$ and $x^2 + 2y^2 - 3xy = 14$

Solution:

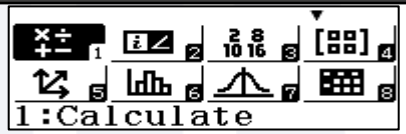
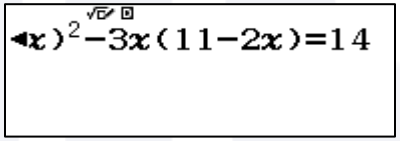
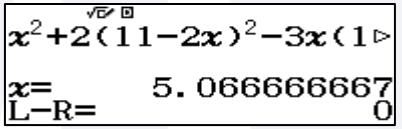
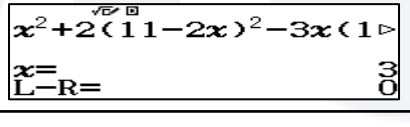
$$2x + y = 11 \quad \ldots\ldots\ldots ①$$

$$x^2 + 2y^2 - 3xy = 14 \quad \ldots\ldots\ldots ②$$

From ① : $y = 11 - 2x$ ……..③

Substitute ③ into ②

$$x^2 + 2(11 - 2x)^2 - 3x(11 - 2x) = 14$$

Command	Screenshot
Choose 'Calculate' in Menu Pilih 'Calculate' di Menu	
Key in $x^2 + 2(11 - 2x)^2 - 3x(11 - 2x) = 14$ • Remember to get '=' symbol press ALPHA CALC • Ingat untuk dapat symbol '=' tekan ALPHA CALC	
To get x_1, press SHIFT CALC and put $x = 1000$ and press = Untuk dapatkan x_1, tekan SHIFT CALC dan masukkan x=1000 tekan =	
To get x_2 ,put $x = -1000$ and press = Untuk dapatkan x_2 , masukkan x=-1000 dan tekan =	

Example-Con't

Thus, $x = \frac{76}{15}$ and $x = 3$

Substitute $x = \frac{76}{15}$ into ③ $\quad y = 11 - 2\left(\frac{76}{15}\right)$

$$y = \frac{13}{15}$$

Substitute $x = 3$ into ③ $\quad y = 11 - 2(3)$

$$y = 5$$

The solutions are $x = \frac{76}{15}$, $y = \frac{13}{15}$ and $x = 3$, $y = 5$.

Let's try!

- Solve the simultaneous equations below

(a) $2x + y = 11$ and $x^2 + 2y^2 - 3xy = 14$

(b) $\frac{x}{2} - \frac{y}{3} - 2 = 0$ and $\frac{4}{x} - \frac{6}{y} + \frac{1}{2} = 0$

(c) $x + y = 6$ and $x^2 - xy + y^2 = 12$

Answer:

(a) $x = \frac{76}{15}, y = \frac{13}{15}$ and $x = 3, y = 5$

(b) $x = 8, y = 6$ and $x = -4, y = -12$

(c) $x = 2, y = 4$ and $x = 4, y = 2$

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F4	Chapter 4 / Bab 4 : Indices, Surds and Logarithms Indeks, Surd dan Logaritma

4.1 Law of Indices / Hukum Indeks
4.2 Law of Surds / Hukum Surd
4.3 Law of Logarithms / Hukum Logaritma

Boost your Curiosity

4.1 Law of Indices / Hukum Indeks

➢ Solve each of the following equations. *Selesaikan setiap persamaan berikut.*

(a) $3^{\frac{1}{4}} \times 15^{\frac{3}{4}} \times 5^{\frac{1}{4}}$ (Ans : 15)

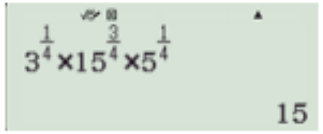
(b) $\dfrac{4^{\frac{3}{2}} \times 16 \times 64^{\frac{1}{3}}}{8^{\frac{5}{3}}}$ (Ans : 16)

(c) $(2\frac{1}{4})^{-\frac{1}{2}}$ (Ans: $\frac{2}{3}$)

➢ **Example**

(a) $3^{\frac{1}{4}} \times 15^{\frac{3}{4}} \times 5^{\frac{1}{4}}$

Solution:

Command	Screenshot
Choose 'Calculate' in Menu	
Key in $3^{\frac{1}{4}} \times 15^{\frac{3}{4}} \times 5^{\frac{1}{4}}$ 	

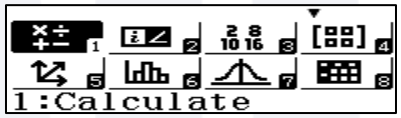
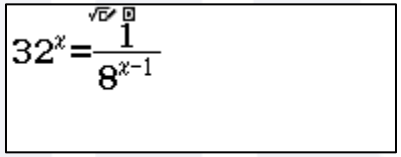
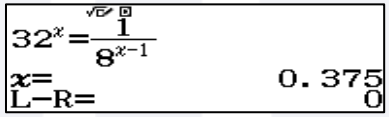
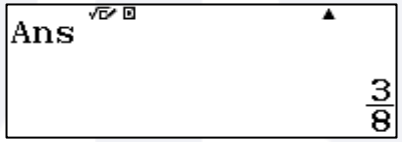
➢ Solve each of the following equations. *Selesaikan setiap persamaan berikut.*

(a) $32^x = \frac{1}{8^{x-1}}$ (Ans : $\frac{3}{8}$)

(b) $25^x - 5^{3x-4} = 0$ (Ans: 4) [IMPORTANT]

(c) $8^{x-3} = \frac{4^{2x}}{64}$ (Ans : -3)

(d) $3^{x+3} - 3^{x+2} = 2$ (Ans:-2)

Command	Screenshot
Choose 'Calculate' in Menu Pilih 'Calculate' di Menu	
Key in $32^x = \frac{1}{8^{x-1}}$ 3 2 $x^{\blacksquare}$ x ▶ ALPHA CALC 1 ▤ 8 $x^{\blacksquare}$ x − 1 • Remember to get '=' symbol press • Ingat untuk dapat symbol '=' tekan	
To get x_1, press SHIFT CALC and press = Untuk dapatkan x_1, tekan SHIFT CALC dan tekan =	
Change to fraction form Ans = Tukar pada bentuk pecahan Ans =	

4.2 Law of Surds / Hukum Surd

➢ *Write the following as single surd. Tulis yang berikut sebagai surd tunggal.*

(a) $\sqrt{2} \times \sqrt{7} =$ *(Ans:* $\sqrt{14}$*)*

(b) $\frac{\sqrt{24}}{\sqrt{8}} =$ *(Ans:* $\sqrt{3}$*)*

(c) $\sqrt{2} \times \sqrt{3} =$ *(Ans:* $\sqrt{6}$*)*

(d) $\frac{\sqrt{18}}{\sqrt{3}} =$ *(Ans:* $\sqrt{6}$*)*

(e) $\frac{\sqrt{5} \times \sqrt{6}}{\sqrt{3}} =$ *(Ans:* $\sqrt{10}$*)*

4.2 Law of Surds / Hukum Surd

- Simplify the following expression. Permudahkan ungkapan berikut.

(a) $\sqrt{2} \times \sqrt{3} + \sqrt{6} =$ (Ans: $2\sqrt{6}$) 

(b) $\sqrt{7}(6 - \sqrt{7}) =$ (Ans: $6\sqrt{7} - 7$)

(c) $\sqrt{18} - \sqrt{8} =$ (Ans: $\sqrt{2}$)

(d) $(6 + 2\sqrt{2})(1 + 3\sqrt{2}) =$ (Ans: $18 + 20\sqrt{2}$)

(e) $(9 + 5\sqrt{4})(3 - 5\sqrt{4}) =$ (Ans :-133)

➢ Find the value of each of the following.

(a) $\log_{10} 45$ (Ans: 1.6532)

(b) $\log_{10}(\frac{3}{4})^3$ [IMPORTANT] (Ans :-0.3748)

(c) $5^{\log_5 4}$ (Ans:4)

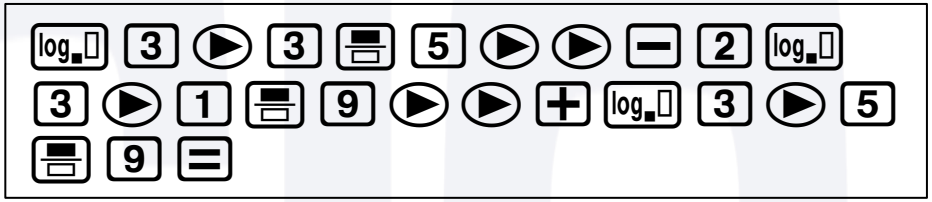
(d) $\log_5 625$ (Ans:4)

(e) $\log_{\frac{1}{3}} 9$ (Ans:-2)

(f) $\log_6 7776$ (Ans: 5)

(g) $\log_3 \frac{3}{5} - 2\log_3 \frac{1}{9} + \log_3 \frac{5}{9}$ (Ans: 3)

➢ Find the value of each of the following.



(a) $\log_3 \frac{3}{5} - 2\log_3 \frac{1}{9} + \log_3 \frac{5}{9} =$ (Ans: 3)

(b) $\log_5 750 - \log_5 6 =$ (Ans: 3)

(c) $\log_3 8 + 2\log_3 6 - \log_3 \frac{96}{9} =$ (Ans: 3)

(d) $\log_2 7 + \log_2 12 - \log_2 21 =$ (Ans:2)

(e) $2\log_4 2 - \frac{1}{2}\log_4 9 + \log_4 12 =$ (Ans: 2)

REMARKS: Textbook page 119
Example 32 (Check with SCI CAL)

CASIO

F4	**Chapter 6 / Bab 6 :** **Linear Law / Hukum Linear**

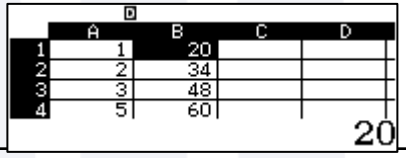
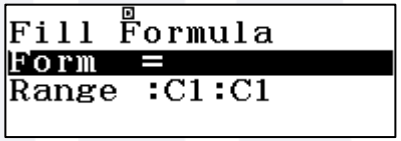
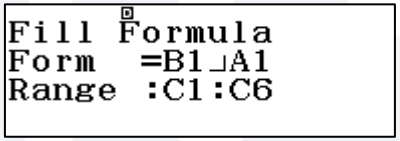
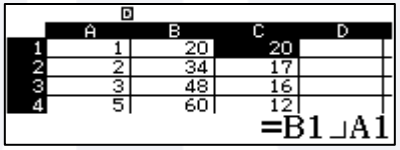
6.1 Linear Law and Non-Linear relations / Hukum Linear dan Hubungan tak Linear

- Construct a table $\frac{y}{x}$ againts x from below data. *Bina satu jadual* $\frac{y}{x}$ *melawan* x *dari data dibawah.*

x	1	2	3	5	7	9
y	20	34	48	60	63	36

Answer:

x	1	2	3	5	7	9
$\frac{y}{x}$	20	12	16	12	9	4

Command	Screenshot
Choose 'Spreadsheet' in Menu Pilih 'Spreadsheet' di Menu	
Key in x and y in the cell Masukkan x dan y pada cell	
Select cell C1 and press OPTN 1 Pilih cell C1 dan tekan OPTN 1	
y: B1 and x: A1 key in / Masukkan Form = ALPHA ,,, 1 ▤ ALPHA (−) 1 = Range : ALPHA x^{-1} 1 ALPHA ∫ ALPHA x^{-1} 6	
Press = = to get the $\frac{y}{x}$ Tekan = = untuk mendapatkan $\frac{y}{x}$	

Let's Try!

1) Construct a table $\frac{1}{u}$ againts $\frac{1}{v}$ from below data. *Bina satu jadual* $\frac{1}{u}$ melawan $\frac{1}{v}$ *dari data dibawah.*

u	10	16	20	25	36
v	10.87	7.81	7.14	6.67	6.17

Answer:

$\frac{1}{u}$	0.1	0.0625	0.05	0.04	0.0278
$\frac{1}{v}$	0.092	0.128	0.14	0.15	0.162

2) Construct a table $\log_{10} y$ againts x from below data. *Bina satu jadual* $\log_{10} y$ againts x *dari data dibawah.*

x	2	4	5	6	7	8	10
y	0.3162	5.0119	100	1584.89	6309.57	63095.73	100000

Answer:

x	2	4	5	6	7	8	10
$\log_{10} y$	-0.50	0.70	2.00	3.20	3.80	4.80	5.00

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F4	Chapter 8 / Bab 8: Vectors / Vektor

8.1 Magnitude of the Vectors / Magnitud bagi Vektor
8.2 Unit Vectors / Vektor Unit
8.3 Arithmetic Operations on two ore more vectors / Operasi aritmetik ke atas dua atau lebih vektor

8.1 Magnitude of the Vectors / Magnitud bagi Vektor

➢ Find the magnitude of the vectors below. *Cari magnitude bagi vektor tersebut.*

1) $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$ 

(Ans : 3.606 unit)

2) $\begin{pmatrix} -4 \\ -7 \end{pmatrix}$ (Ans : 8.062 unit)

3) $-12i - 5j$ (Ans : 13 unit)

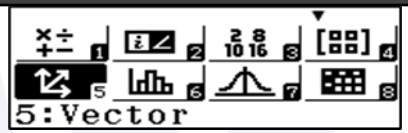
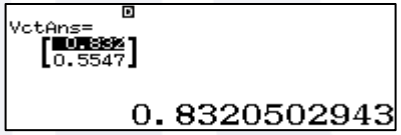
4) $\begin{pmatrix} 0 \\ -\frac{4}{7} \end{pmatrix}$ (Ans : $\frac{4}{7}$ unit)

5) $6i$ (Ans : 6 unit)

8.2 Unit Vectors / Vektor Unit

- Find the unit vectors below. *Cari vektor unit tersebut.*

1) $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$

Command	Screenshot
Choose 'Vector' in Menu	
Define **p** as 'VctA' [1] [2] [3] [=] [2] [=]	
Get the unit vector [OPTN] [3] [OPTN] [▼] [4] [OPTN] [3] [=]	

8.3 Arithmetic Operations on two ore more vectors / Operasi aritmetik ke atas dua atau lebih vektor

- The position vector $\overrightarrow{OP}$ can be expressed as a column vector.

$$\overrightarrow{\boldsymbol{OP}} = \begin{pmatrix} \boldsymbol{x} \\ \boldsymbol{y} \end{pmatrix}$$

- Given **p**=3**i** + 5**j**, **q**=10**i** -8**j** and **r**=4**i** – 2**j**,

Find each of the following

(a) **p** + **q** + **r**
(a) **q** – **r** – **p**
(b) 2**p** – **q** – 3**r**
(c) | **p** – 2**r** |

Answer:

- 17**i** – 5**j** (b) 3**i** – 11**j** (c) -16**i** + 24**j** (d) 10.296 or $\sqrt{106}$

8.3 Arithmetic Operations on two ore more vectors / Operasi aritmetik ke atas dua atau lebih vektor

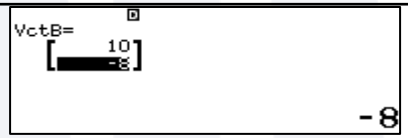
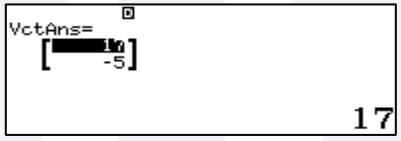
Example:-

Given **p**=3**i** + 5**j**, **q**=10**i** -8**j** and **r**=4**i** – 2**j**,

Find each of the following

(a) p + q + r

Solution using Classwiz:

Command	Screenshot
Choose 'Vector' in Menu Pilih 'Vector' di menu	
Define **p** as 'VctA' / 1 2 3 = 5 =	
Define **q** as 'VctB' OPTN 1 2 2 1 0 = (–) 8 =	
Define **r** as 'VctC' OPTN 1 3 2 4 = (–) 2 =	
Calculate **p + q + r** OPTN 3 OPTN 3 + OPTN 4 + OPTN 5 =	

Answer: 17**i** – 5**j**

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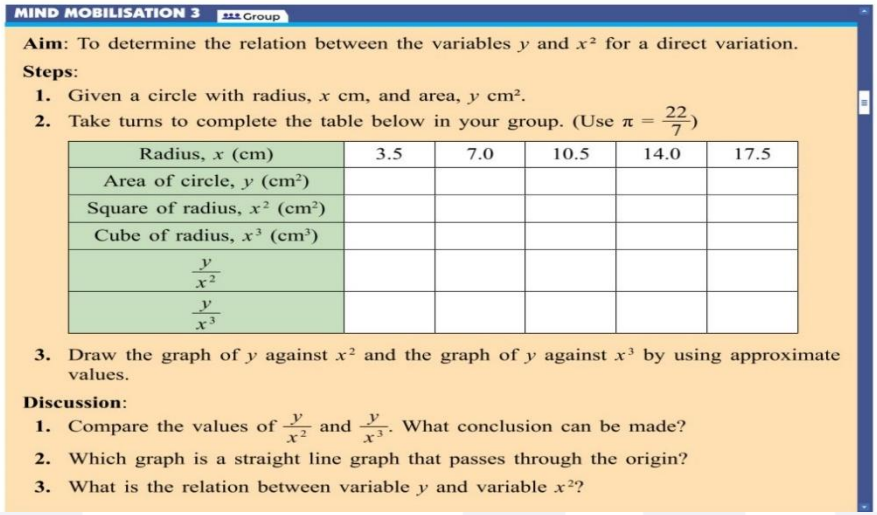
F5	Chapter 1 / Bab 1: Variation / Ubahan

1.1 Direct Variation / Ubahan Langsung
8.2 Unit Vectors / Vektor Unit
8.3 Arithmetic Operations on two ore more vectors / Operasi aritmetik ke atas dua atau lebih vektor

1.1 Direct Variation / Ubahan Langsung (Text Book – Example 2 Page 7 0



MIND MOBILISATION 3 Group

Aim: To determine the relation between the variables y and x^2 for a direct variation.

Steps:

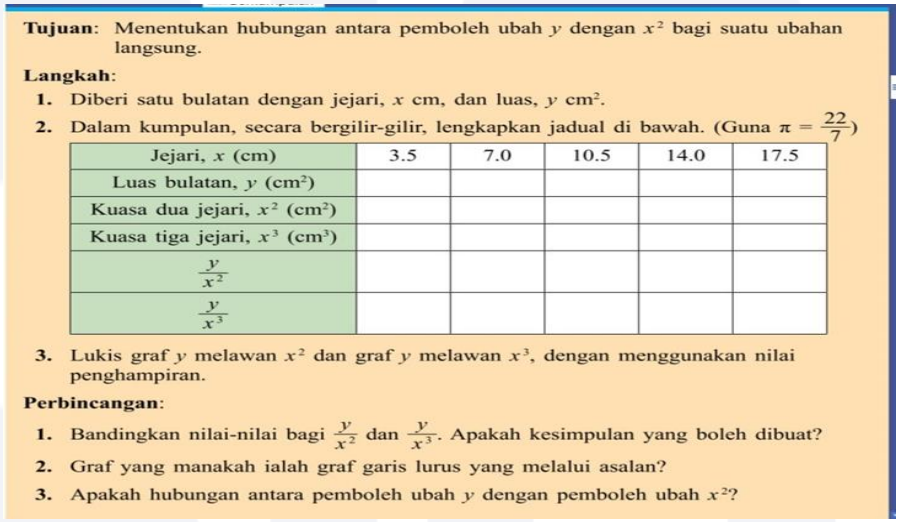
1. Given a circle with radius, x cm, and area, y cm².
2. Take turns to complete the table below in your group. (Use $\pi = \frac{22}{7}$)

Radius, x (cm)	3.5	7.0	10.5	14.0	17.5
Area of circle, y (cm²)					
Square of radius, x^2 (cm²)					
Cube of radius, x^3 (cm³)					
$\frac{y}{x^2}$					
$\frac{y}{x^3}$					

3. Draw the graph of y against x^2 and the graph of y against x^3 by using approximate values.

Discussion:

1. Compare the values of $\frac{y}{x^2}$ and $\frac{y}{x^3}$. What conclusion can be made?
2. Which graph is a straight line graph that passes through the origin?
3. What is the relation between variable y and variable x^2?



Tujuan: Menentukan hubungan antara pemboleh ubah y dengan x^2 bagi suatu ubahan langsung.

Langkah:

1. Diberi satu bulatan dengan jejari, x cm, dan luas, y cm².
2. Dalam kumpulan, secara bergilir-gilir, lengkapkan jadual di bawah. (Guna $\pi = \frac{22}{7}$)

Jejari, x (cm)	3.5	7.0	10.5	14.0	17.5
Luas bulatan, y (cm²)					
Kuasa dua jejari, x^2 (cm²)					
Kuasa tiga jejari, x^3 (cm³)					
$\frac{y}{x^2}$					
$\frac{y}{x^3}$					

3. Lukis graf y melawan x^2 dan graf y melawan x^3, dengan menggunakan nilai penghampiran.

Perbincangan:

1. Bandingkan nilai-nilai bagi $\frac{y}{x^2}$ dan $\frac{y}{x^3}$. Apakah kesimpulan yang boleh dibuat?
2. Graf yang manakah ialah graf garis lurus yang melalui asalan?
3. Apakah hubungan antara pemboleh ubah y dengan pemboleh ubah x^2?

Fill up the table by using Spreadsheet in Classwiz Calculator.

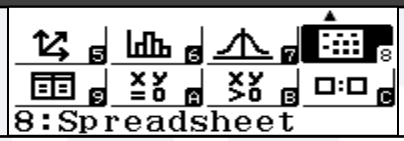
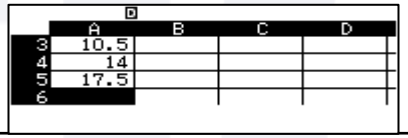
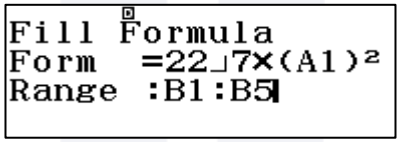
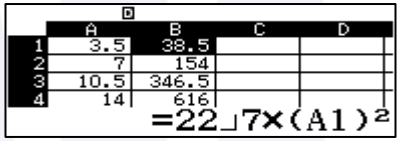
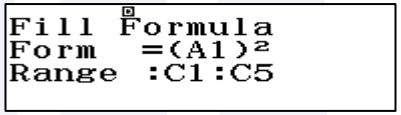
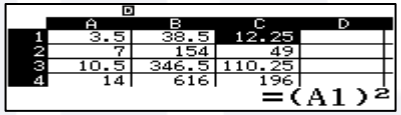
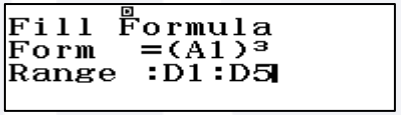
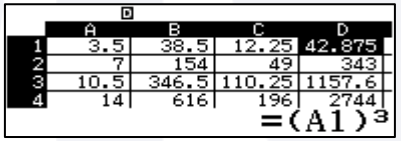
Isi jadual dengan menggunakan kalkulator Classwiz.

Radius/ Jejari , x	3.5	7.0	10.5	14.0	17.5
Area of Circle/ Luas Bulatan , y					
Square of radius / Kuasa dua jejari ,x^2					
Cube of radius / Kuasa tiga jejari, x^3					
$\frac{y}{x^2}$					
$\frac{y}{x^3}$					

$$Area\ of\ Circle = y = \frac{22}{7} \times x^2$$

1.1 Direct Variation / Ubahan Langsung (Text Book – Example 2 Page 7 0

Answer :

Command	Screenshot
Choose 'Spreasheet' in Menu Pilih 'Spreadsheet' di menu	
Key in x in Column A Key in x pada Column A	
Key in y in Column B Key in y pada Column B $Area\ of\ Circle = y = \frac{22}{7} \times x^2$ OPTN 1 2 2 ▦ 7 ✕ (ALPHA (−) 1) x^2 = ▶ ▶ ▶ ▶ ▶ ▶ DEL 5 = =	 
Key in x^2in Column C Key in x^2 pada Column C OPTN 1 (ALPHA (−) 1) x^2 = ▶ ▶ ▶ ▶ ▶ ▶ DEL 5 = =	 
Key in x^3in Column D Key in x^3pada Column D OPTN 1 (ALPHA (−) 1) SHIFT x^2 = ▶ ▶ ▶ ▶ ▶ ▶ DEL 5 = =	 

Continue

Command	Screenshot
Key in $\frac{y}{x^2}$ in Column E Key in $\frac{y}{x^2}$ pada Column E OPTN 1 ALPHA ,,, 1 ▤ ALPHA x^{-1} 1 = ▶ ▶ ▶ ▶ ▶ ▶ ▶ DEL 5 = =	Fill Formula Form =B1⌟C1 Range :E1:E5 B C D E 1 38.5 12.25 42.875 3.1428 2 154 49 343 3.1428 3 346.5 110.25 1157.6 3.1428 4 616 196 2744 3.1428 =B1⌟C1
Key in $\frac{y}{x^3}$ in Column E Key in $\frac{y}{x^3}$ pada Column E OPTN 1 ALPHA ,,, 1 ▤ ALPHA sin 1 = ▶ ▶ ▶ ▶ ▶ ▶ ▶ DEL 5 = = ◀ ▼ ▼ ▼ ▼	Fill Formula Form =B1⌟D1 Range :E1:E5 B C D E 2 154 49 343 0.4489 3 346.5 110.25 1157.6 0.2993 4 616 196 2744 0.2244 5 962.5 306.25 5359.3 0.1795 =B5⌟D5

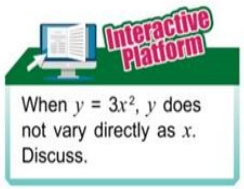
Radius/ Jejari , x	3.5	7.0	10.5	14.0	17.5
Area of Circle/ Luas Bulatan , y	38.5	154	346.5	616	962.5
Square of radius / Kuasa dua jejari ,x^2	12.25	49	110.25	196	306.25
Cube of radius / Kuasa tiga jejari, x^3	42.875	343	1157.6	2744	5359.3
$\frac{y}{x^2}$	3.1428	3.1428	3.1428	3.1428	3.1428
$\frac{y}{x^3}$	0.8979	0.4489	0.2993	0.2244	0.1795

Let's Try!

Example 2

A toy car moves from a state of rest. The distance travelled by the toy car, y, changes with time, t, as shown in the table below.

Time, t (s)	2	4	6	8	10	12
Distance, y (cm)	14	28	42	56	70	84



When $y = 3x^2$, y does not vary directly as x. Discuss.

Determine whether y varies directly as t or t^2. Hence, write the relation in the form of variation.

Solution:

t	2	4	6	8	10	12
y	14	28	42	56	70	84
$\frac{y}{t}$	$\frac{14}{2} = 7$	$\frac{28}{4} = 7$	$\frac{42}{6} = 7$	$\frac{56}{8} = 7$	$\frac{70}{10} = 7$	$\frac{84}{12} = 7$
$\frac{y}{t^2}$	$\frac{14}{2^2} = 3.50$	$\frac{28}{4^2} = 1.75$	$\frac{42}{6^2} = 1.17$	$\frac{56}{8^2} = 0.88$	$\frac{70}{10^2} = 0.70$	$\frac{84}{12^2} = 0.58$

y varies directly as t because the value of $\frac{y}{t}$ is a constant. Hence, $y \propto t$.

y does not vary directly as t^2 because $\frac{y}{t^2}$ is not a constant.

Contoh 2

Sebuah kereta mainan bergerak daripada keadaan pegun. Jarak yang dilalui oleh kereta mainan itu, y, berubah dengan masa, t, seperti yang ditunjukkan dalam jadual di bawah.

Masa, t (s)	2	4	6	8	10	12
Jarak, y (cm)	14	28	42	56	70	84

Apabila $y = 3x^2$, y tidak berubah secara langsung dengan x. Bincangkan.

Tentukan sama ada y berubah secara langsung dengan t atau t^2. Seterusnya, tuliskan hubungan tersebut dalam bentuk ubahan.

Penyelesaian:

t	2	4	6	8	10	12
y	14	28	42	56	70	84
$\frac{y}{t}$	$\frac{14}{2} = 7$	$\frac{28}{4} = 7$	$\frac{42}{6} = 7$	$\frac{56}{8} = 7$	$\frac{70}{10} = 7$	$\frac{84}{12} = 7$
$\frac{y}{t^2}$	$\frac{14}{2^2} = 3.50$	$\frac{28}{4^2} = 1.75$	$\frac{42}{6^2} = 1.17$	$\frac{56}{8^2} = 0.88$	$\frac{70}{10^2} = 0.70$	$\frac{84}{12^2} = 0.58$

y berubah secara langsung dengan t kerana nilai $\frac{y}{t}$ ialah pemalar. Maka, $y \propto t$.

y tidak berubah secara langsung dengan t^2 kerana nilai $\frac{y}{t^2}$ bukan pemalar.

CASIO®

F5	**Chapter 2 :** **Matrices / Matriks**

2.1 Addition and Subtraction of Matrices / Penambahan dan penolakan bagi Matriks
2.2 Multiplication of a Matrix by a Number / Mendarab Matriks dengan suatu nombor
2.3 Multiplication of Two Matrices / Mendarab dua Matriks
2.4 Inverse Matrices / Matrik Songsang
2.5 Determinant / Penentu
2.6 Solve Simultaneous Linear Equations Using Matrices

2.1 Addition and Subtraction of Matrices / Penambahan dan penolakan bagi Matriks

Two matrices can be added or subtracted only if they are of the same order.
Dua Matriks boleh ditambah dan ditolak jika mempunyai peringkat yang sama.

- **Example:-**

1) Find a matrix by adding or subtracting between two matrices below.
   Cari Matriks dengan penambahan atau penolakan antara dua matriks di bawah.

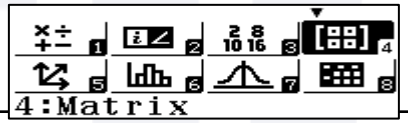
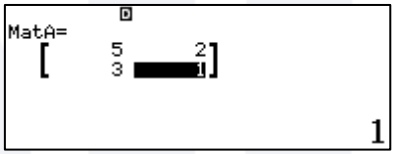
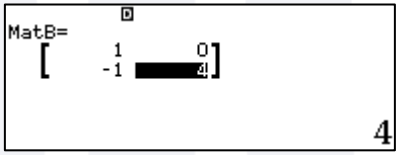
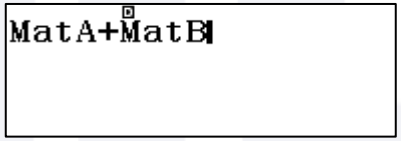
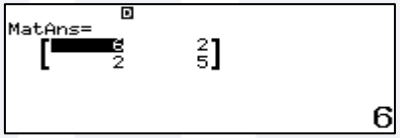
$A=\begin{pmatrix}5 & 2\\ 3 & 1\end{pmatrix}$ $B=\begin{pmatrix}1 & 0\\ -1 & 4\end{pmatrix}$ $C=\begin{pmatrix}-1 & 0\\ 2 & -3\end{pmatrix}$ $D=\begin{pmatrix}-1 & 5\\ 4 & 0\end{pmatrix}$

i) A+B
ii) B-C
iii) D+A
iv) C-D
v) B+D

Solution using Classwiz

1) $A=\begin{pmatrix}5 & 2\\ 3 & 1\end{pmatrix}$ $B=\begin{pmatrix}1 & 0\\ -1 & 4\end{pmatrix}$ $C=\begin{pmatrix}-1 & 0\\ 2 & -3\end{pmatrix}$ $D=\begin{pmatrix}-1 & 5\\ 4 & 0\end{pmatrix}$

i) A+B

Command	Screenshot
Choose 'Matrix' in Menu Pilih ' Matrix' pada Menu	
Define Matrix A by key in number of rows and columns Masukkan matriks A dengan memasukkan baris dan lajur [1] [2] [2] [5] [=] [2] [=] [3] [=] [1] [=]	
Define Matrix B by key in number of rows and columns Masukkan matriks B dengan memasukkan baris dan lajur [OPTN] [1] [2] [2] [2] [1] [=] [0] [=] [(-)] [1] [=] [4] [=]	
Calculate / Kira A+B [OPTN] [3] [OPTN] [3] [+] [OPTN] [4]	
Press [=] to get the answer Tekan [=] untuk dapatkan jawapan	

Answer:- A+B= $\begin{pmatrix}6 & 2\\ 2 & 5\end{pmatrix}$

Let's try!

1) Find a matrix by adding or subtracting between two matrices below
Cari Matriks dengan penambahan atau penolakan antara dua matriks di bawah.

A=$\begin{pmatrix} 5 & 2 \\ 3 & 1 \end{pmatrix}$ B=$\begin{pmatrix} 1 & 0 \\ -1 & 4 \end{pmatrix}$ C=$\begin{pmatrix} -1 & 0 \\ 2 & -3 \end{pmatrix}$ D=$\begin{pmatrix} -1 & 5 \\ 4 & 0 \end{pmatrix}$

i) A+B= Answer: $\begin{pmatrix} 6 & 2 \\ 2 & 5 \end{pmatrix}$

ii) B-C = Answer: $\begin{pmatrix} 2 & 0 \\ -3 & 7 \end{pmatrix}$

iii) D+A = Answer: $\begin{pmatrix} 4 & 7 \\ 7 & 1 \end{pmatrix}$

iv) C-D = Answer: $\begin{pmatrix} 0 & -5 \\ -2 & -3 \end{pmatrix}$

v) B+D = Answer: $\begin{pmatrix} 0 & 5 \\ 3 & 4 \end{pmatrix}$

2.2 Multiplication of a Matrix by a Number / Mendarab Matriks dengan suatu nombor

- **Example:-**

1) Find a matrix below:-

$A=\begin{pmatrix}5 & 2\\ 3 & 1\end{pmatrix}$ $B=\begin{pmatrix}1 & 0\\ -1 & 4\end{pmatrix}$ $C=\begin{pmatrix}-1 & 0\\ 2 & -3\end{pmatrix}$ $D=\begin{pmatrix}-1 & 5\\ 4 & 0\end{pmatrix}$

i) 5A+B

ii) 2C

iii) D+2A

iv) 3C-D

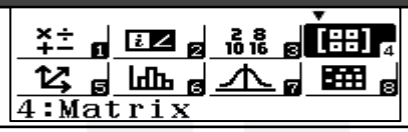
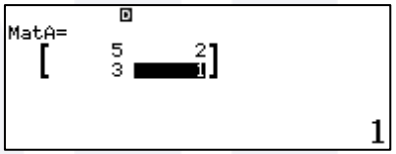
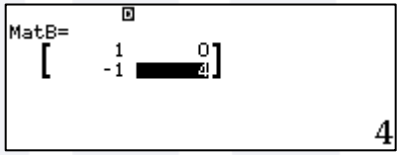
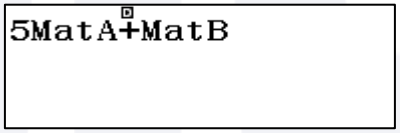
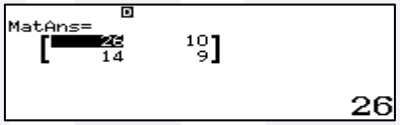
v) 2B+D

Solution using Classwiz

- $A=\begin{pmatrix}5 & 2\\ 3 & 1\end{pmatrix}$ $B=\begin{pmatrix}1 & 0\\ -1 & 4\end{pmatrix}$ $C=\begin{pmatrix}-1 & 0\\ 2 & -3\end{pmatrix}$ $D=\begin{pmatrix}-1 & 5\\ 4 & 0\end{pmatrix}$

i) 5A+B

Solution:

Command	Screenshot
Choose 'Matrix' in Menu Pilih ' Matrix ' pada menu	
Define Matrix A by key in number of rows and columns Masukkan matriks A dengan memasukkan baris dan lajur 1 2 2 5 = 2 = 3 = 1 =	
Define Matrix B by key in number of rows and columns Masukkan matriks B dengan memasukkan baris dan lajur OPTN 1 2 2 2 1 = 0 = (−) 1 = 4 =	
Calculate / Kira 5A+B OPTN 3 5 OPTN 3 + OPTN 4	
Press = to get the answer Tekan = untuk dapatkan jawapan	

Answer:- 5A+B= $\begin{pmatrix}26 & 10\\ 14 & 9\end{pmatrix}$

Let's try!

1) Find a matrix below:-

A=$\begin{pmatrix} 5 & 2 \\ 3 & 1 \end{pmatrix}$ B=$\begin{pmatrix} 1 & 0 \\ -1 & 4 \end{pmatrix}$ C=$\begin{pmatrix} -1 & 0 \\ 2 & -3 \end{pmatrix}$ D=$\begin{pmatrix} -1 & 5 \\ 4 & 0 \end{pmatrix}$

i) 5A+B= $\begin{pmatrix} 26 & 10 \\ 14 & 9 \end{pmatrix}$

ii) 2C= $\begin{pmatrix} -2 & 0 \\ 4 & -6 \end{pmatrix}$

iii) D+2A= $\begin{pmatrix} 9 & 9 \\ 10 & 2 \end{pmatrix}$

iv) 3C-D = $\begin{pmatrix} -2 & -5 \\ 2 & -9 \end{pmatrix}$

v) 2B+D= $\begin{pmatrix} 1 & 5 \\ 2 & 8 \end{pmatrix}$

2.3 Multiplication of Two Matrices / Mendarab dua Matriks

- **Example:-**

1) Find a matrix below:-

$A=\begin{pmatrix}5 & 2\\ 3 & 1\end{pmatrix}$ $B=\begin{pmatrix}1 & 0\\ -1 & 4\end{pmatrix}$ $C=\begin{pmatrix}3 & 2 & 1\\ 1 & 0 & 1\end{pmatrix}$ $D=\begin{pmatrix}4\\ 0\\ 1\end{pmatrix}$

i) A x B

ii) C x D

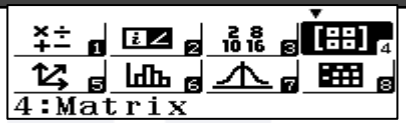
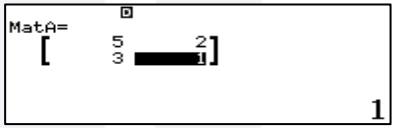
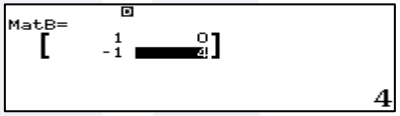
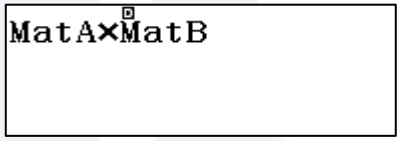
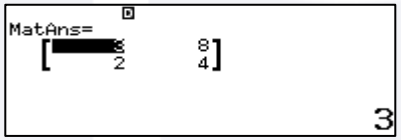
iii) B x A

Solution using Classwiz

- $A=\begin{pmatrix}5 & 2\\ 3 & 1\end{pmatrix}$ $B=\begin{pmatrix}1 & 0\\ -1 & 4\end{pmatrix}$ $C=\begin{pmatrix}3 & 2 & 1\\ 1 & 0 & 1\end{pmatrix}$ $D=\begin{pmatrix}4\\ 0\\ 1\end{pmatrix}$

Solution: Using Classwiz

i) A x B

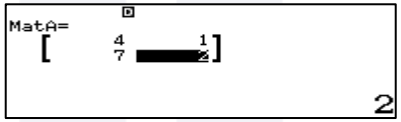
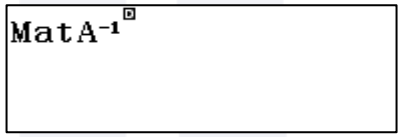
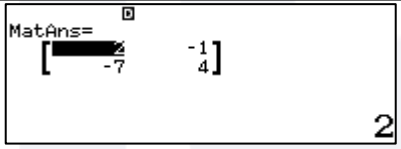
Command	Screenshot
Choose 'Matrix' in Menu Pilih ' Matrix' pada Menu	
Define Matrix A by key in number of rows and columns Masukkan matriks A dengan memasukkan baris dan lajur 1 2 2 5 = 2 = 3 = 1 =	
Define Matrix B by key in number of rows and columns Masukkan matriks B dengan memasukkan baris dan lajur OPTN 1 2 2 2 1 = 0 = (−) 1 = 4 =	
Calculate / Kira AxB OPTN 3 OPTN 3 × OPTN 4	
Press = to get the answer Tekan = untuk dapatkan jawapan	

Answer:- AxB= $\begin{pmatrix}3 & 8\\ 2 & 4\end{pmatrix}$

2.4 Inverse Matrices / Matriks Songsang

Determine whether $\begin{pmatrix} 2 & -1 \\ -7 & 4 \end{pmatrix}$ is the inverse matrix of $\begin{pmatrix} 4 & 1 \\ 7 & 2 \end{pmatrix}$:-

Tentukan sama ada $\begin{pmatrix} 2 & -1 \\ -7 & 4 \end{pmatrix}$ adalah matriks songsang bagi A= $\begin{pmatrix} 4 & 1 \\ 7 & 2 \end{pmatrix}$:-

Command	Screenshot
Choose 'Matrix' in Menu Pilih ' Matrix' pada Menu	
Define Matrix A by key in number of rows and columns Masukkan matriks A dengan memasukkan baris dan lajur 1 2 2 4 = 1 = 7 = 2 =	
Determine the inverse matrix Tentukan Matriks songsang OPTN 3 OPTN 3 x^{-1}	
Press = to get the answer Tekan = untuk dapatkan jawapan	

Answer/ Jawapan : Yes

Let's Try!

Determine whether the following matrices are inverse matrices of one another
Tentukan sama ada Matriks berikut adalah matriks songsang antara satu sama :-

1- $\begin{pmatrix} 5 & 4 \\ 3 & 2 \end{pmatrix}, \begin{pmatrix} 2 & -4 \\ -3 & 5 \end{pmatrix}$ Ans: Not inverse matrices

2- $\begin{pmatrix} 1 & 3 \\ 1 & 4 \end{pmatrix}, \begin{pmatrix} \frac{1}{2} & 3 \\ 1 & 2 \end{pmatrix}$ Ans: Not inverse matrices

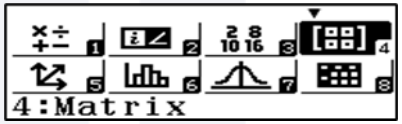
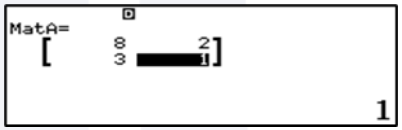
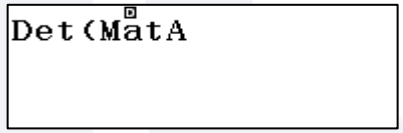
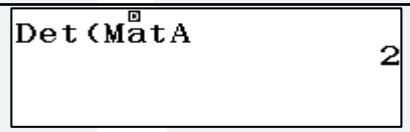
3- $\begin{pmatrix} 1 & 2 \\ 4 & 9 \end{pmatrix}, \begin{pmatrix} 1 & -2 \\ -4 & 9 \end{pmatrix}$ Ans: Not inverse matrices

4- $\begin{pmatrix} -2 & 3 \\ -5 & 7 \end{pmatrix}, \begin{pmatrix} 7 & -3 \\ 5 & -2 \end{pmatrix}$ Ans: Yes, inverse matrices

2.5 Determinant / Penentu

Find the determinant of the matrix / Cari penentu bagi matriks:-

A= $\begin{pmatrix} 8 & 2 \\ 3 & 1 \end{pmatrix}$ B= $\begin{pmatrix} -1 & -4 \\ 2 & 5 \end{pmatrix}$ C= $\begin{pmatrix} -2 & 1 \\ 7 & -4 \end{pmatrix}$ D= $\begin{pmatrix} 2 & 1 \\ 4 & 3 \end{pmatrix}$

Command	Screenshot
Choose 'Matrix' in Menu Pilih ' Matrix' pada Menu	
Define Matrix A by key in number of rows and columns Masukkan matriks A dengan memasukkan baris dan lajur 1 2 2 8 = 2 = 3 = 1 =	
Find the determinant / cari penentu OPTN 3 OPTN ▼ 2 OPTN 3	
Press = to get the answer Tekan = untuk dapatkan jawapan	

Answer/ Jawapan : Yes

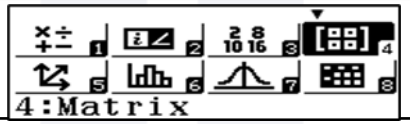
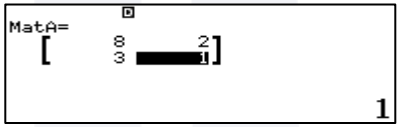
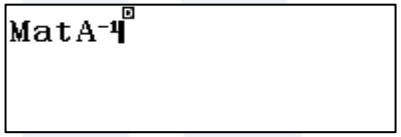
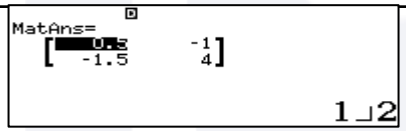
Solution using Classwiz

a) Please find the inverse matrix below:-

A= $\begin{pmatrix} 8 & 2 \\ 3 & 1 \end{pmatrix}$ B= $\begin{pmatrix} -1 & -4 \\ 2 & 5 \end{pmatrix}$ C=$\begin{pmatrix} -2 & 1 \\ 7 & -4 \end{pmatrix}$ D=$\begin{pmatrix} 2 & 1 \\ 4 & 3 \end{pmatrix}$

i) A^{-1}

Solution: Using Classwiz

Command	Screenshot
Choose 'Matrix' in Menu Pilih ' Matrix' pada Menu	
Define Matrix A by key in number of rows and columns Masukkan matriks A dengan memasukkan baris dan lajur 1 2 2 8 = 2 = 3 = 1 =	
Calculate / kira A^{-1} OPTN 3 OPTN 3 x^{-1}	
Press = to get the answer Tekan = untuk dapatkan jawapan	

Answer:- $A^{-1} = \begin{pmatrix} 0.5 & -1 \\ -1.5 & 4 \end{pmatrix} = \frac{1}{2}\begin{pmatrix} 1 & -2 \\ -3 & 8 \end{pmatrix} = \begin{pmatrix} \frac{1}{2} & -1 \\ -\frac{3}{2} & 4 \end{pmatrix}$

Let's try!

a) Please find the inverse matrix below:-

A= $\begin{pmatrix} 8 & 2 \\ 3 & 1 \end{pmatrix}$ B= $\begin{pmatrix} -1 & -4 \\ 2 & 5 \end{pmatrix}$ C=$\begin{pmatrix} -2 & 1 \\ 7 & -4 \end{pmatrix}$ D=$\begin{pmatrix} 2 & 1 \\ 4 & 3 \end{pmatrix}$

i) $A^{-1}= \begin{pmatrix} 0.5 & -1 \\ -1.5 & 4 \end{pmatrix}$

ii) $B^{-1}= \begin{pmatrix} \frac{5}{3} & \frac{4}{3} \\ \frac{-2}{3} & \frac{1}{3} \end{pmatrix}$

iii) $C^{-1}= \begin{pmatrix} -4 & -1 \\ -7 & -2 \end{pmatrix}$

iv) $D^{-1}= \begin{pmatrix} \frac{3}{2} & \frac{-1}{2} \\ -2 & 1 \end{pmatrix}$

2.6 Solve Simultaneous Linear Equations Using Matrices

➢ **Example:-**

a) Given the simultaneous linear equations, find the value of $x \ and \ y$
Diberi linear persamaan serentak, Cari nilai bagi $x \ dan \ y$

$$x + 2y = 5$$
$$2x - 3y = -4$$

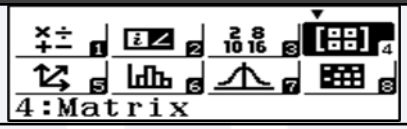
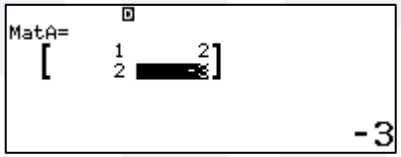
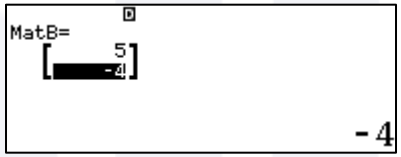
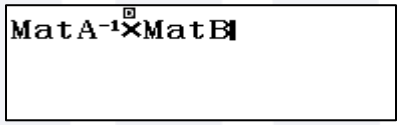
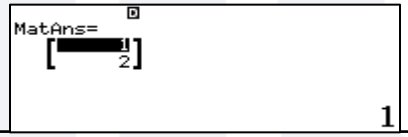
Rewrite the simultaneous linear equation as a matrix equation
Tulis persamaan serentak dalam bentuk matriks

$$\begin{pmatrix} 1 & 2 \\ 2 & -3 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{matrix} 5 \\ -4 \end{matrix}$$

Find the inverse of $\begin{pmatrix} 1 & 2 \\ 2 & -3 \end{pmatrix}$ using Classwiz

Cari Matriks songsang bagi $\begin{pmatrix} 1 & 2 \\ 2 & -3 \end{pmatrix}$ menggunakan kalkulator Classwiz

1.5 Solve Simultaneous Linear Equations Using Matrices

Command	Screenshot
Choose 'Matrix' in Menu Pilih ' Matrix' pada Menu	
Define Matrix A by key in number of rows and columns Masukkan matriks A dengan memasukkan baris dan lajur 1 2 2 1 = 2 = 2 = (−) 3 =	
Define Matrix A by key in number of rows and columns Masukkan matriks A dengan memasukkan baris dan lajur OPTN 1 2 2 1 5 = (−) 4 =	
Calculate / Kira A^{-1}x B OPTN 3 OPTN 3 x^{-1} × OPTN 4	
Press = to get the answer Tekan = untuk dapatkan jawapan	

Ans : $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$

Let's try!

a) The inverse matrix of $\begin{pmatrix} -1 & 4 \\ 2 & 3 \end{pmatrix}$ is $\frac{1}{k}\begin{pmatrix} 3 & m \\ -2 & -1 \end{pmatrix}$, find the values of m and k.

Answer: m=-4 and k=-11

CASIO

F5	Chapter 7 / Bab 7: Measures of Dispersion for Grouped Data / Sukatan Serakan Data Terkumpul

7.1 Measures of Dispertion / Sukatan Serakan

7.1 Measures of Dispertion / Sukatan Serakan

English	Bahasa
Class interval	Selang kelas
Lower limit	Had bawah
Upper Limit	Had atas
Midpoint	Titik tengah
Lower Boundary	Semapadan bawah
Upper boundary	Sempadan atas
Cumulative frequency	Longgokan kekerapan

Reminder!

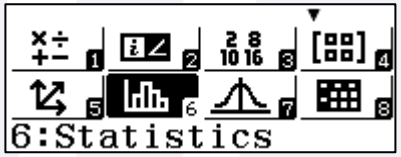
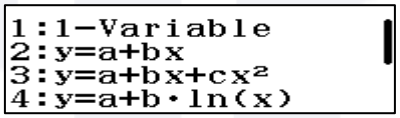
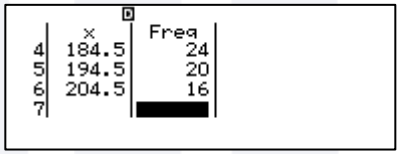
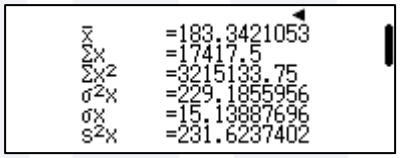
- The answer of first quartile, median and third quartile can not be used as references because need to get from ogive graph (CF against upper boundary)
- Jawapan bagi kuartil pertama, median dan kuartil ketiga tidak boleh dijadikan rujukan kerana perlu menggunakan graf ogif (Longgokan kekerapan lawan sempadan atas

) From the grouped data, find:-

i) Range / Julat
ii) Mean / Min
iii) Variance / Varians, σ^2
iv) Standard deviation / Sisihan piawai, σ

Volume of water, L Isi padu air	Number of families Bilangan keluarga
150-159	8
160-169	12
170-179	15
180-189	24
190-199	20
200-209	16

Solve using Classwiz

Command	Screenshot
Converts 'Menu' to 'Statistics' Tukarkan 'Menu' kepada 'Statistics'	
Choose 1: 1-Variable Pilih 1:1- Variable	
On Frequency column / Buka column kekerapan SHIFT MENU ▼ 3 1	
Key in all data / Masukkan semua data x - Midpoint / titik tengah f - Frequency / kekerapan	
To get the information / Dapatkan maklumat OPTN 3	

Remember

x – midpoint / titik tengah

$\sum x$ - Frequency x midpoint

$\sum x^2$-fx^2

$\sigma^2 x$ - Variance

σx – Standard Deviation

7.1 Measures of Dispertion / Sukatan Serakan

i) Range / Julat

= Midpoint of highest class – midpoint of lower class

=Titik tengah kelas tertinggi – Titik tengah kelas terendah

= Max (x) – min (x) = 204.5 – 154.5

= 50

i) Mean / Min, $\bar{x}$

$= \frac{\sum fx}{\sum f}$

$= \frac{\sum x}{n} = \frac{17417.5}{95} = 183.34$

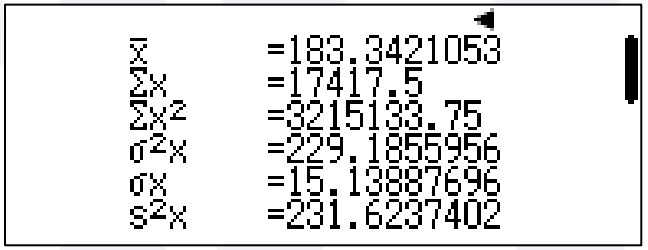
i) Variance / Varians, σ^2

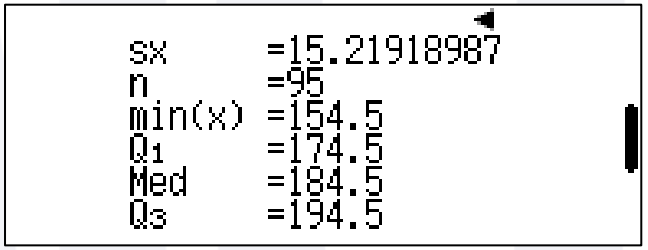
$= \frac{\sum fx^2}{\sum f} - \bar{x}^2$

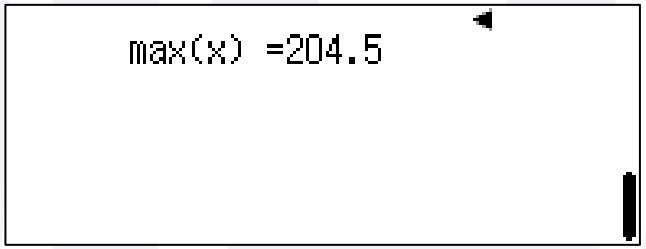
$= \frac{\sum x^2}{n} - \bar{x}^2 = \frac{3215133.75}{95} - \left(\frac{17417.5}{95}\right)^2 = 229.19$

i) Standard deviation / Sisihan piawai, σ

$= \sqrt{= \frac{\sum fx^2}{\sum f} - \bar{x}^2} = \sqrt{229.1855956} = 15.14$







Let's try!

Time(s)	Frequency
21-25	5
26-30	11
31-35	15
36-40	7
41-45	2

1) The table shows the times taken by a grouped of students to complete a task. Find:-
Jadual menunjukkan masa yang diambil oleh sekumpulan pelajar untuk menyelesaikan ujian. Cari :-

i) Range / Julat (Ans : 20)

ii) Mean / Min, $\bar{x}$ (Ans: 31.75 s)

iii) Variance / Varians, σ^2 (Ans: 27.19 s^2)

iv) Standard deviation / Sisihan piawai , σ (Ans: 5.214s)

CASIO

Graphs of Functions

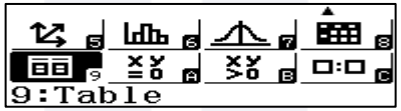
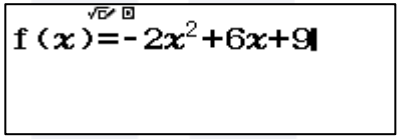
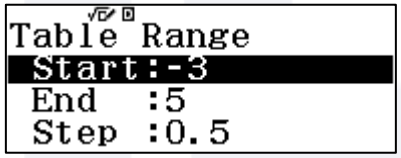
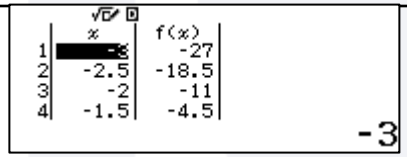
1.1 Graphical Solution of Equations

Solution

(a) Complete table for the equation $y = -2x^2 + 6x + 9$
Lengkapkan jadual pagi persamaan $y = -2x^2 + 6x + 9$

x	-3	-2	-1	0	1.5	3	4	5
y	-27		1	9	13.5		1	-11

Solution using Classwiz:

Command	Screenshot
Choose 'Table' in menu Pilih 'Table' pada menu	
Key in function $y = -2x^2 + 6x + 9$ to $f(x)$ and skip for $g(x)$ by pressing = Masukkan persamaan $y = -2x^2 + 6x + 9$ pada $f(x)$ dan melangkau $g(x)$ dengan menekan =	
Key in Range Start= for smallest of x / Nilai x yang terkecil End = for biggest of x/ Nilai x yang terbesar Step = smallest step / Julat yang terkecil	
Press = to get y values Tekan = untuk dapatkan nilai y	

When $x = -2, y = -11$ and when $x = 3, y = 9$

Solution

Solution using Classwiz:
Purpose: To check shape of equation / Untuk periksa bentuk bagi persamaan

Command	Screenshot
Continue from previous command Press SHIFT OPTN to get QR Code Sambungan dengan sebelumnya Tekan SHIFT OPTN Untuk dapatkan QR code	 1/1

CASIO®

F5	Chapter 1 / Bab 1: Circular measure / Sukatan membulat

1.1 Convert the angle from Radian to angle / Tukarkan sudut dari radia ke darjah
1.2 Convert the angle from degree to radian / Tukarkan sudut dari darjah ke radian

1.1 Convert the angle from radian to degree / Tukarkan sudut dari radian ke darjah

Example 1

Convert each of the following angles into degrees.
[Use $\pi = 3.142$]

(a) $\frac{2}{5}\pi$ rad (b) 2.25 rad

Solution

(a) π rad $= 180°$

$$\frac{2}{5}\pi \text{ rad} = \frac{2}{5}\pi \times \frac{180°}{\pi}$$
$$= \frac{2}{5} \times 180°$$
$$= 72°$$

(b) π rad $= 180°$

$$2.25 \text{ rad} = 2.25 \times \frac{180°}{\pi}$$
$$= 2.25 \times \frac{180°}{3.142}$$
$$= 128° 54'$$

Use Classwiz :

(a)

Command	Screenshot
2 ▼ 5 ▶ SHIFT ×10^x OPTN 2 2 =	$\frac{2}{5}\pi^r$ 72

(b)

Command	Screenshot
2 • 2 5 OPTN 2 2 = °,,,	2.25^r 128°54'55.81"

Let's Try!

Convert the angle from radian to degree / Tukarkan sudut dari radian ke darjah

1) $\frac{\pi}{8}$ rad (Ans: $22.5°$)

2) $\frac{3}{4}\pi$ rad (Ans: $135°$)

3) 0.5 rad (Ans: $28°39'$)

4) 1.04 rad (Ans: $59°\ 35'$)

1.2 Convert the angle from degree to radian / Tukarkan sudut dari darjah ke radian

Example 2

(a) Convert 40° and 150° into radians, in terms of π.
(b) Convert 110° 30′ and 320° into radians.
[Use π = 3.142]

Solution

(a) $180° = \pi$ rad

$40° = 40° \times \frac{\pi}{180°}$

$= \frac{2}{9}\pi$ rad

$150° = 150° \times \frac{\pi}{180°}$

$= \frac{5}{6}\pi$ rad

(b) $180° = \pi$ rad

$110°\ 30' = 110°\ 30' \times \frac{\pi}{180°}$

$= 110°\ 30' \times \frac{3.142}{180°}$

$= 1.929$ rad

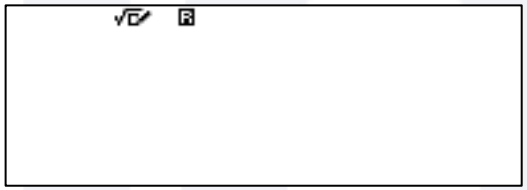
$320° = 320° \times \frac{\pi}{180°}$

$= 320° \times \frac{3.142}{180°}$

$= 5.586$ rad

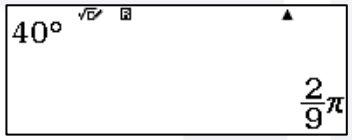
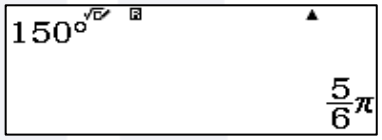
Remarks
Ensure the Angle Unit in Radian
pastikan unit sudut dalam Radian

SHIFT MENU 2 2

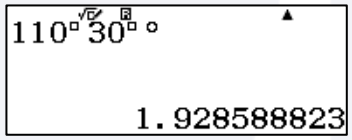
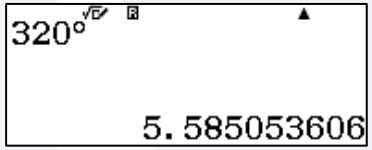


Use Classwiz :

(a)

Command	Screenshot
4 0 OPTN 2 1 =	 
1 5 0 OPTN 2 1 =	

(b)

Command	Screenshot
1 1 0 °''' 3 0 °''' OPTN 2 1 = S⇔D	 
3 2 0 OPTN 2 1 = S⇔D	

Let's Try!

Convert the angle from degree to radian / Tukarkan sudut dari darjah ke radian

1) $18°$ (Ans: $\frac{1}{10}\pi$rad)

2) $120°$ (Ans: $\frac{2}{3}\pi$rad)

3) $225°$ (Ans: $1\frac{1}{4}\pi$rad)

4) $300°$ (Ans: $1\frac{2}{3}\pi$rad)

CASIO

F5	Chapter 2 / Bab 2: Differentiation / Pembezaan

2.1 Gradient of the Tangent /Kecerunan tangen

2.1 Gradient of the Tangent /Kecerunan tangen

➢ Find the gradient of the tangent below / Cari kecerunan tangen di bawah

(a) Given $y = \frac{2x}{x^2-5}$ when $x = 0$. Find the gradient of the curve.

(b) Given $y = x^2 + 4x - 3$, find the gradient of the curve at the point where $x = -3$.

(c) Given $y = \frac{2}{x^3}$, find the value of $\frac{dy}{dx}$ when $x = 2$.

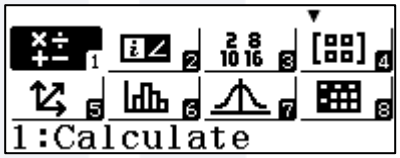
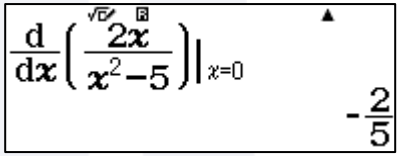
(d) The curve $y = x^3 - 6x^2 + 9x + 1$ passes through the point A(2,3). Find the gradient of the curve at A.

1.1 Gradient of the tangent to a curve

Example:

(a) Given $y = \frac{2x}{x^2-5}$ when $x = 0$. Find the gradient of the curve.

Solution using Classwiz:

Command	Screenshot
Choose 'Calculate' in Menu	
SHIFT ∫ 2 x ▭ x x^2 − 5 ▶ ▶ 0 =	

Let's try!

- Find the gradient of the tangent below

(a) Given $y = \frac{2x}{x^2-5}$ when $x = 0$. Find the gradient of the curve.

(b) Given $y = x^2 + 4x - 3$, find the gradient of the curve at the point where $x = -3$.

(c) Given $y = \frac{2}{x^3}$, find the value of $\frac{dy}{dx}$ when $x = 2$.

(d) The curve $y = x^3 - 6x^2 + 9x + 1$ passes through the point A(2,3). Find the gradient of the curve at A.

Answer:

(a) $-\frac{2}{5}$ (b) -2 (c) -0.375 (d) -3

CASIO

F5	Chapter 3/ Bab 3: Integration Pengamiran

3.1 Definite integrals / Kamiran tentu

- Definite integrals have the upper and lower limits of integrations
- Find the values of the following integrations.

(a) $\int_0^1 (x+3)^2 dx$

(b) $\int_{-1}^3 10\, dx$

(c) $\int_1^2 \frac{x^3+4}{x^2} dx$

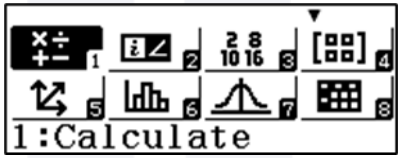
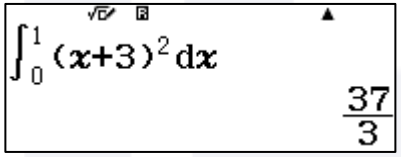
(d) $\int_1^2 (\frac{4}{x^3} + 6x)\, dx$

Example:

➢ Find the values of the following integrations.

(a) $\int_0^1 (x+3)^2 dx$

Solution using Classwiz:

Command	Screenshot
Choose 'Calculate' in Menu	
Key in $\int_0^1 (x+3)^2 dx$ 	

Let's try!

- Find the values of the following integrations.

(a) $\int_0^1 (x+3)^2 dx$

(b) $\int_{-1}^3 10\, dx$

(c) $\int_1^2 \frac{x^3+4}{x^2} dx$

(d) $\int_1^2 (\frac{4}{x^3} + 6x)\, dx$

Answer:

(a) $\frac{37}{3}$ (b) 40 (c) $3\frac{1}{2}$ (d) $10\frac{1}{2}$

CASIO

F5	Chapter 4 / Bab 4 : Permutations and Combinations / Pilih Atur dan Gabungan

4.1 Permutations
4.2 Combinations

- In permutation, the order of arrangement of the objects is important

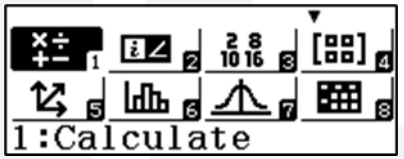
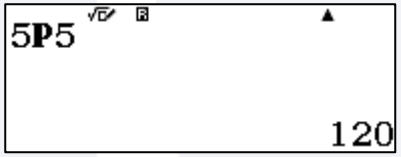
- **Example:**

Five committee members are to sit in a row to have their picture taken. Find the number of ways they can be seated if

(a) there is no restriction

(b) two of them who are husband and wife have to sit next to each other.

Solution:

Command	Screenshot
Choose 'Calculate' in Menu	
5 SHIFT × 5 =	

Answer: 120

Example-Con't

(b) Two of them who are husband and wife have to sit next to each other

Solution:

Consider the husband and wife as one person so that they are next to each other. The total number of arrangements of 4 persons is ${}^4P_4$. The husband and wife can be arranged in ${}^2P_2$ ways.

Thus, total number of ways they can be seated $= {}^4P_4 \times {}^2P_2$

$= 48$

Let's try!

(a) Find the number of four-digit numbers which can be formed from the digits 1, 2 , 3, 4, 5 and 6.

(b) The working committee of a Mathematics Club consisting of a chairman, vice-chairman, secretary and treasurer is to be elected from 9 members of the club. Find the number of different committees that can be formed.

(c) Find the number of four-digit even numbers which can be formed from the digits 1, 2, 4, 5 and 8.

Answer:

(a) ${}^{6}P_{4}=360$ (b) ${}^{9}P_{4}=3024$ (c) ${}^{3}P_{1} \times {}^{4}P_{3}= 72$

- In combination, the order of arrangement of the objects is not important

Example:

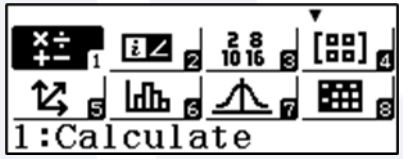
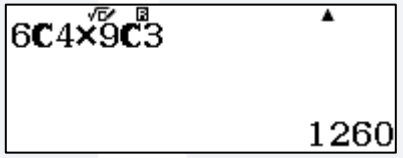
A debating team consists of 7 students. The team will be chosen from a group of 9 boys and 6 girls. Find the number of teams that can be formed such that each team consists of

(a) 4 girls

(b) Not more than 3 boys

Solution:

(a) ${}^{6}C_{4} \times {}^{9}C_{3}$

Command	Screenshot
Choose 'Calculate' in Menu	
6 SHIFT ÷ 4 × 9 SHIFT ÷ 3 =	

Answer: 1260

Example-Con't

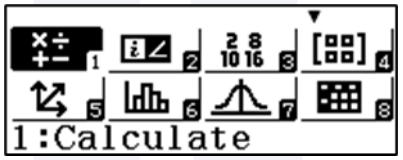
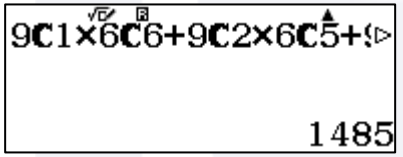
(b) Not more than 3 boys

Solution:

Number of teams that can be formed

$= {}^{9}C_1 \times {}^{6}C_6 + {}^{9}C_2 \times {}^{6}C_5 + {}^{9}C_3 \times {}^{6}C_4$

$= 1485$

Command	Screenshot
Choose 'Calculate' in Menu	
9 SHIFT ÷ 1 × 6 SHIFT ÷ 6 + 9 SHIFT ÷ 2 × 6 SHIFT ÷ 5 + 9 SHIFT ÷ 3 × 6 SHIFT ÷ 4 =	

Let's try!

An examination question paper has four questions in section A and three questions in section B. A students has to answer five questions from the paper. Find the number of ways of selecting the questions if the student

(a) Can answer any five questions from sections A and B

(b) must answer three questions from section A and two questions from section B.

Answer:

(a) ${}^{7}C_{5} = 21$

(b) ${}^{4}C_{3} \times {}^{3}C_{2} = 12$

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F5	Chapter 5 / Bab 5 : Probability Distributions / Taburan Kebarangkalian

5.1 Binomial Distributions / Taburan Binomial
5.2 Normal Distributions : Probability
5.3 Normal Distribution : Z-score

5.1 Binomial Distribution / Taburan Binomial

- **To solve a problem involves Binomial Distribution.**

Binomial PD	When X is exact. E.g: P(x=3)
Binomial CD	When X is more than, at least, not more

Example: From Past Year Question SPM 2013, Paper 2- Section B

1 (a) It is found that 70% of the students from a certain class obtained grade A in Geography in SPM trial examination.
If 10 students from the class are selected at random, find the probability that

(i) exactly 8 students obtained grade A

(ii) not more than 8 students obtained grade A

Solution

(i) exactly 8 students obtained grade A

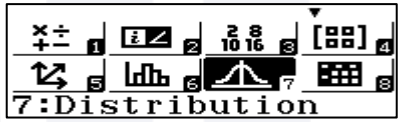
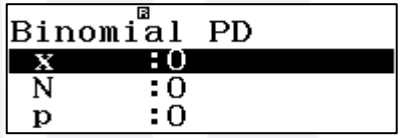
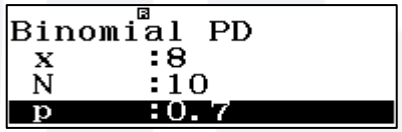
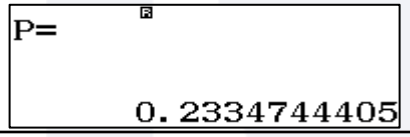
$P(X = 8), \quad p = 0.7, \quad q = 0.3 \quad n = 10$

Method 1(Practically)

$P(X = 8) = {}^{10}C_8(0.7)^8(0.3)^2$

$= 0.2335$

Method 2: Using Classwiz

Command	Screenshot
Choose 'Distribution' in Menu,	
Choose 'Binomial PD', press '4' and choose 'variable' [4] [2]	
Key in x=8, N =10, p= 0.7 [8] [=] [1] [0] [=] [0] [•] [7] [=]	
Press [=] , to get the answer	

Hence, $P(X = 8)$= 0.2335

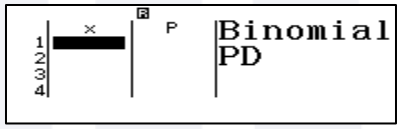
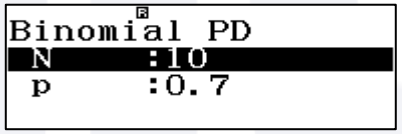
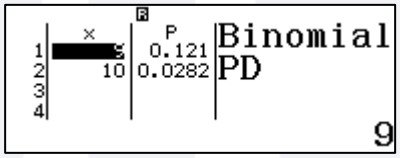
Solution- Con't

(ii) not more than 8 students obtained grade A

Method 1(Practically)

$$P(X \leq 8) = 1 - P(> 8)$$
$$= 1 - P(X = 9) - P(X = 10)$$
$$= 1 - {}^{10}C_9(0.7)^{10}(0.3)^1 - {}^{10}C_{10}(0.7)^{10}(0.3)^0$$
$$= 0.8507$$

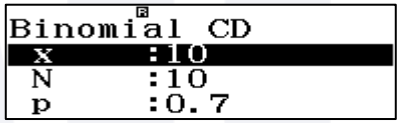
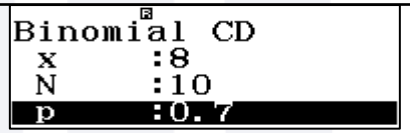
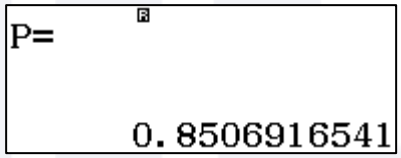
Method 2: Using Classwiz (Binomial PD)

Command	Screenshot
Choose 'Distribution' in Menu,	
Choose 'Binomial PD', press '4' and choose 'List' 4 1	
Key in x=9 and 10 9 = 1 0 = =	
Key in N=10, p=0.7 1 0 = 0 • 7 = = Then, $1 - P(X = 9) - P(X = 10)$ or use storage	

P(X ≤ 8)=1- 0.1211-0.0282
= 0.8507

Method 3: Using Classwiz (Binomial CD)

(ii) not more than 8 students obtained grade A=$P(X \leq 8)$

Command	Screenshot
Choose 'Distribution' in Menu,	
Choose 'Binomial CD' and 'Variable' ▼ 1 2	
Key in x=8, N=10, p=0.7 8 = 1 0 = 0 • 7 =	
Press =, to get the probabilities	

Hence, $P(X \leq 8)$= 0.8507

Let's try!

Question from Past Year SPM 2012 Paper 1

1) In a test, 60% of the students has passed. A sample of 8 students is chosen at random. Find the probability that more than 6 students from the sample passed the test.

Answer:

$P(X \geq 6) = 0.1064$

Tips:

If use Binomial PD, $\boldsymbol{P(X \geq 6) = P(X = 7) + P(X = 8)}$

If use Binomial CD, $\boldsymbol{P(X \leq 6) = 1 - P(X \leq 6)}$

- **To solve a problem involves Normal Distribution.**

Normal PD	When X is exact. E.g: P(x=3)
Normal CD	When X is more than, at least, not more
	$P(X > z)$, key in lower=z and upper=100000 $P(X < z)$, key in lower=-100000 and upper=z

Example: From Past Year Question SPM 2013, Paper 2- Section B

1 (a) The Cumulative Grade Point Average (CGPA) of the final year students in a university follows a normal distribution with a mean of 2.6 and a standard deviation of 0.25.

(i) If one student is randomly selected, find the probability that the CGPA of the student is more than 3.0.

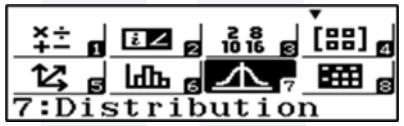
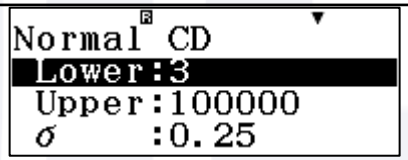
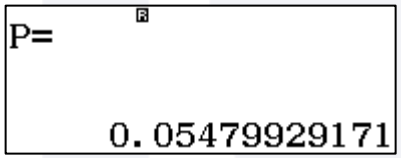
Solution

(i) If one student is randomly selected, find the probability that the CGPA of the student is more than 3.0.

Method 1:Practically

$$P(X > 3.0) = P(\frac{X-\mu}{\sigma} > \frac{3.0-2.6}{0.25})$$
$$= P(z > 1.6)$$
$$= 0.0548$$

Method 2: Using Classwiz

Command	Screenshot
Choose 'Distribution' in Menu,	
Choose 'Normal CD' and Key in Lower=3.0, Upper=100000, $\sigma = 0.25$, $\mu = 2.6$	
Press =, to get the probabilities	

Hence, $P(X > 3.0) = 0.0548$

Let's try!

Question from Past Year SPM 2014 Paper 2

1) The mass of the scout members in the school follows a normal distribution with a mean of 48kg and a standard deviation of 5.8kg. Find

(i) the probability that a member chosen a random from the group has a mess less than 45kg.

Answer:

$P(X < 45) = 0.3025$

Tips:

If use Normal CD, lower=-100000

- **Remember, Classwiz is only able to find left side area of graph. Therefore, to find area of right side must (1 minus with left side area).**

Example: From Past Year Question SPM 2013, Paper 2- Section B

1 (a) The Cumulative Grade Point Average (CGPA) of the final year students in a university follows a normal distribution with a mean of 2.6 and a standard deviation of 0.25.

(i) A degree will be given to the final year students who obtained CGPA more than k. If 89.5% of the students manage to get a degree, find the value of k.

Solution

(i) A degree will be given to the final year students who obtained CGPA more than k. If 89.5% of the students manage to get a degree, find the value of k.

Method 1 (Practically)

$$P(X > k) = 0.895$$

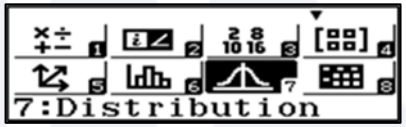
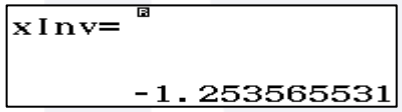
$$P\left(X > \frac{k-2.6}{0.25}\right) = 0.895$$

$$P(X > -1.253) = 0.895$$

$$\frac{k-2.6}{0.25} = -1.253$$

$$= 2.287$$

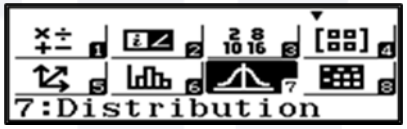
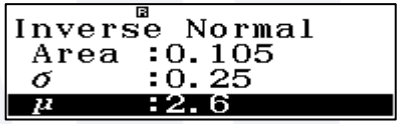
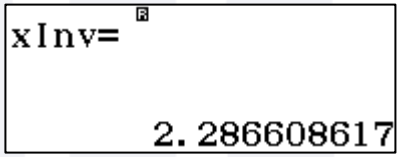
Method 2 : Using Classwiz (Probability)

Command	Screenshot
Choose 'Distribution' in Menu,	
Choose 'Inverse Normal', key in Area= 1-0.895, $\sigma = 1$, $\mu = 0$	

$$\frac{k-2.6}{0.25} = -1.253$$

$$= 2.287$$

Method 3 : Using Classwiz (z-score)

Command	Screenshot
Choose 'Distribution' in Menu,	
Choose 'Inverse Normal', key in Area= 1-0.895, $\sigma = 0.25$, $\mu = 2.6$	
Press [=], to get the Z-score	

Hence, $P(X > k) = 0.895$

$k = 2.287$

Question from Past Year SPM 2014 Paper 2

1) The mass of the scout members in the school follows a normal distribution with a mean of 48kg and a standard deviation of 5.8kg. Find

(i) the value of m, if 25% of the scout members have mass more than m kg.

Answer:

$P(X > m) = 0.25,\ m = 51.91$

Tips:

- **Inverse normal**
- **1 minus with 0.25**
- **Put $\sigma = 1,\ \mu = 0$ to get the PROBABILITY**
- **Put $\sigma = 5.8,\ \mu = 48$, to get Z-SCORE**

Let's try!

Question from Past Year SPM 2018 Paper 2 Section B

1) A study shows that the credit card balance of the customers is normally distributed as shown in Diagram below.

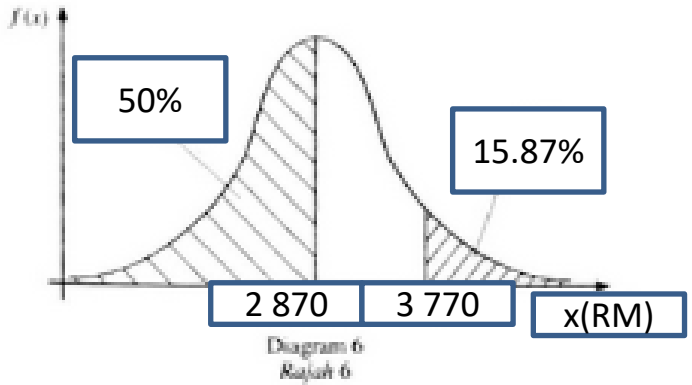


Diagram 6
Rajah 6

(a) (i) Find the standard deviation.

(ii) If 30 customers are chosen at random, find the number of customers who have a credit card balance between RM1 800 and RM 3 000.

(b) It is found that 25% of the customers have a credit card balance less than RM y. Find the value of y.

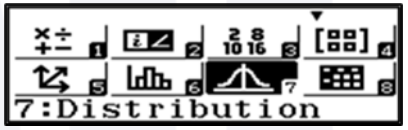
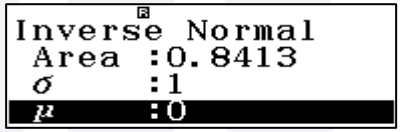
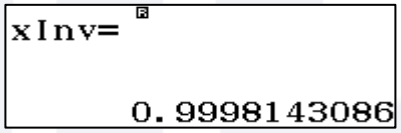
Solution

(i) Find the standard deviation.

$\mu = 2\,870,\ x = 3\,370$

P(X> 3770) = 15.87%

P(Z> $\frac{3770-2870}{\sigma}$) = 0.1587

Command	Screenshot
Choose 'Distribution' in Menu,	
Choose 'Inverse Normal', key in Area= 1-0.1587 $\sigma = 1,\ \mu = 0$	
Press =, to get the Z-score	

Hence, P(Z> 0.9999)=0.1587

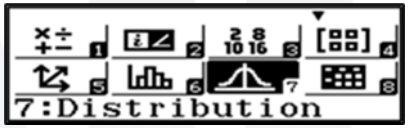
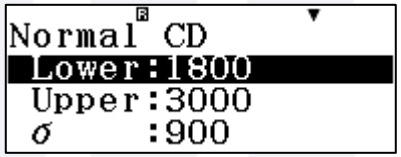
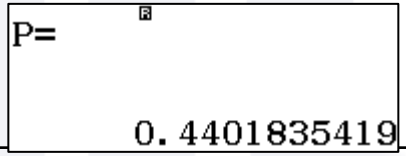
$\frac{3770-2870}{\sigma} = 0.9999$

$\sigma = 900$

Let's try!

(ii) If 30 customers are chosen at random, find the number of customers who have a credit card balance between RM1 800 and RM 3 000.

P(1800<X<3000)=

Command	Screenshot
Choose 'Distribution' in Menu,	
Choose 'Normal CD ', key in Lower= 1800, Upper= 3000 , $\sigma = 900$, $\mu = 2870$	
Press [=] , to get the probabilities	

P(1800<X<3000)= 0.4401

Number of customers= 0.4401 x 30

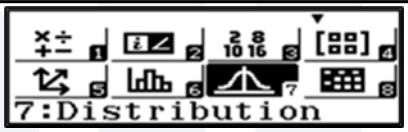
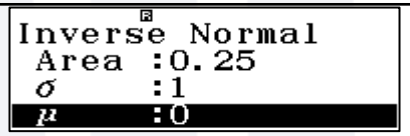
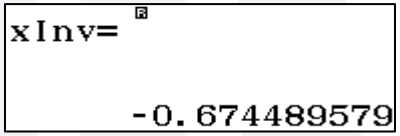
= 14

Let's try!

(b) It is found that 25% of the customers have a credit card balance less than RM y.
Find the value of y.

$\mu = 2\,870$

$P(x < y) = 25\%$

Command	Screenshot
Choose 'Distribution' in Menu,	
Choose 'Inverse Normal', key in Area= 0.25, $\sigma = 1$, $\mu = 0$	
Press [=], to get the Z-score	

$P(Z < -0.674) = 0.25$

$\frac{y-2870}{900} = -0.674$

$y = 2263.40$