

Basic Algebra 3

We know when students are just beginning their study of algebra, the basic concepts can be difficult to grasp. These activities are written for teachers to use in their basic algebra classes.

When you find other helpful exercises, add these to your own eActivities.

Good exercises encourage students!

This file includes eActivities on:

- 1 **Spreadsheet +, -** – Try simple addition and subtraction within Spreadsheet.
- 2 **Variable Expression** – Evaluate variable expressions using Spreadsheet.
- 3 **Ratio and Equation** – Solve the equation to find the price and then enter it into Spreadsheet.
- 4 **Recursive Sequence** – Using Spreadsheet with recursion.
- 5 **Matrix +, -** – Now for simple matrix addition and subtraction.
- 6 **Matrix x** – Next, try multiplying the matrices. Use Verify to check your answers.
- 7 **Points on Graph** – Watch the coordinates change when you move the points.
- 8 **Graph Functions** – Can you guess what each graph will look like?
- 9 **Algebraic Errors** – Don't let these mistakes trip you up. Verify will help you with each step.

Spreadsheet +, -

Try simple addition and subtraction within Spreadsheet.

File Edit Insert Action

Spreadsheet +, -

<Example>
Calculate Total

	male	female	Total
Green	12	18	?
Blue	9	23	?
Red	17	10	?
White	15	14	?

On the spreadsheet,
 $D2=B2+C2$.

Spreadsheet Example

Try your own.
On the spreadsheet, try subtracting males from females.

	A	B	C	D
1		male	female	Total
2	Green	12	18	
3	Blue	9	23	
4	Red	17	10	
5	White	15	14	

Alg Standard Real Rad

Variable Expression

Evaluate variable expressions using Spreadsheet.

File Edit Insert Action

Variable Expression

<Example>
Variable expression is $10-m$ and $10 \times m$.

Calculation

Try your own exercise.
On the spreadsheet, try evaluating $10m+10$.

	A	B	C	D
1	m	$10-m$	$10 \times m$	
2	1	9	10	
3	2	8	20	
4	4	6	40	
5	8	2	80	

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Ratio and Equation

Solve the equation to find the price and then enter it into Spreadsheet.

Ratio and Equation

<Example>

Number	Price(\$)
50	35
90	55
100	60
120	?

Spreadsheet

The equation to describe the data is $y=0.5x+10$.

When the number is 120, the price is,
 $0.5 \times 120 + 10$

70

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File Edit Graph Action

	A	B
1	Number	Price(\$)
2	50	35
3	90	55
4	100	60
5	120	
6		
7	Draw the scatter	
8	graph.	
9		
10	Drag and Drop the	
11	equation to the	
12	Graph window.	
13	$y=0.5x+10$	
14		
15		

R18

Recursive Sequence

Using Spreadsheet with recursion.

Recursive Sequence

<Example>
 Find the missing value A.
 [3 8 13 18 A 28 33 38]

Table

On the table, $B3=A4-A3$.
 The difference between the numbers is 5.

$A=18+5$

A=23

Try your own.
 Find the missing value A.
 [11 4 -3 A -17 -24]

Table

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Recursive Sequence

<Example>
 Find the missing value A.
 [3 8 13 18 A 28 33 38]

Table

On the table, $B3=A4-A3$.
 The difference between

	A	B	C
1	Recursive		
2		Difference	
3	3	5	
4	8	5	
5	13	5	
6	18	5	

Recursive

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Matrix +, -

Now for simple matrix addition and subtraction.

Matrix +, -

<Example>

$$\begin{bmatrix} 1 & 2 \\ -1 & -2 \\ 3 & -3 \end{bmatrix} + \begin{bmatrix} 10 & 10 \\ 10 & 10 \\ 10 & 10 \end{bmatrix}$$

$$= \begin{bmatrix} 1+10 & 2+10 \\ -1+10 & -2+10 \\ 3+10 & -3+10 \end{bmatrix}$$

$$= \begin{bmatrix} 11 & 12 \\ 9 & 8 \\ 13 & 7 \end{bmatrix}$$

Try these exercises.
 $\begin{bmatrix} 1 & 2 \\ -1 & -2 \end{bmatrix} + \begin{bmatrix} 10 & 10 \\ 10 & 10 \end{bmatrix} = ?$

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Try these exercises.

$\begin{bmatrix} 1 & 2 \\ -1 & -2 \\ 3 & -3 \end{bmatrix} - \begin{bmatrix} 10 & 10 \\ 10 & 10 \\ 10 & 10 \end{bmatrix} = ?$

Ex-1 $f(x) =$

$\begin{bmatrix} 10 & 10 \\ 10 & 10 \\ 10 & 10 \end{bmatrix} - \begin{bmatrix} 1 & 2 \\ -1 & -2 \\ 3 & -3 \end{bmatrix} = ?$

Ex-2 $f(x) =$

$\begin{bmatrix} 10 & 10 \\ 10 & 10 \\ 10 & 10 \end{bmatrix} + \begin{bmatrix} 1 & 2 \\ -1 & -2 \\ 3 & -3 \end{bmatrix} = ?$

Ex-3 $f(x) =$

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Matrix x

Next, try multiplying the matrices. Use Verify to check your answers.

The image shows two screenshots of a TI-84 Plus calculator interface. The left screenshot shows an example of matrix multiplication and two exercises. The right screenshot shows three exercises.

Left Screenshot:

- Menu: File Edit Insert Action
- Matrix x
- <Example>
- $$\begin{bmatrix} 1 & 2 \\ 0 & 8 \end{bmatrix} \cdot \begin{bmatrix} 1 & 4 \\ 2 & 5 \end{bmatrix}$$
- $$= [1 \cdot 1 + 2 \cdot 2 \quad 1 \cdot 4 + 2 \cdot 5]$$
- $$= [1+4 \quad 4+10]$$
- $$= [5 \quad 14]$$
- Try these exercises.
- Ex-1: $\begin{bmatrix} 1 & 2 \\ 0 & 8 \end{bmatrix} \begin{bmatrix} 4 & 6 \\ 7 & 2 \end{bmatrix} = ?$
- Ex-2: $\begin{bmatrix} 4 & 6 \\ 7 & 2 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 0 & 8 \end{bmatrix} = ?$
- Bottom: Alg Standard Real Rad

Right Screenshot:

- Menu: File Edit Insert Action
- Try these exercises.
- Ex-1: $\begin{bmatrix} 1 & 2 \\ 0 & 8 \end{bmatrix} \begin{bmatrix} 4 & 6 \\ 7 & 2 \end{bmatrix} = ?$
- Ex-2: $\begin{bmatrix} 4 & 6 \\ 7 & 2 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 0 & 8 \end{bmatrix} = ?$
- Ex-3: $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 8 & 9 \end{bmatrix} \begin{bmatrix} 4 & 6 \\ 7 & 2 \\ 3 & 9 \end{bmatrix} = ?$
- Bottom: Alg Standard Real Rad

Basic Rule for Algebra manipulation

Points on the Graph

Watch the coordinates change when you move the points.

Points on the Graph

Tap ----->

$x = \begin{cases} x \text{ coordinate} \\ y \text{ coordinate} \end{cases}$

Select a point and notice the coordinates at the bottom of the screen.

Move the point to coordinates of your choice.

Points on the Graph

$x = \begin{cases} x \text{ coordinate} \\ y \text{ coordinate} \end{cases}$

Select a point and notice the coordinates at the bottom of the screen.

Move the point to coordinates of your choice.

Graph Functions

Can you guess what each graph will look like?

Graph Functions

<Example>
Graph functions.
 $y=2x-3$
 $y=x^2-2$
 $y=|x|$
 $y=\frac{1}{x}$
 $y=\sqrt{x}$
 $y=2^x$

Graph window --->

To change the graph, check an equation and tap the graph button.

Edit Zoom Analysis

Sheet1 | Sheet2 | Sheet3

$y1=2 \cdot x-3$

$y2=x^2-2$

$y3=|x|$

$y4=\frac{1}{x}$

$y5=\sqrt{x}$

Rad Real

Algebraic Errors

Don't let these mistakes trip you up. Verify will help you with each step.

Algebraic Errors

$\frac{a}{x+b} \neq \frac{a}{x} + \frac{a}{b}$

Hint f(x)=

$\sqrt{x^2+a^2} \neq x+a$

Hint f(x)=

$a-b(x-1)+a-bx-b$

Hint f(x)=

Algebraic Errors

$\frac{a}{x+b} \neq \frac{a}{x} + \frac{a}{b}$

Hint f(x)=

$\sqrt{x^2+a^2} \neq x+a$

Hint f(x)=

$a-b(x-1)+a-bx-b$

Hint f(x)=

Eq: $((a)/(x))+((a)/(b))$