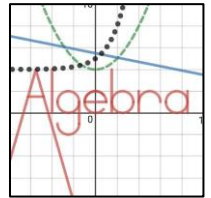




Desmos 101: Algebra I
Charge Up! With Desmos (Beginners)
Session: T-048a (8:00am)



ACTIVITY 1: LINEAR EQUATIONS

- 1) Graph the following coordinates: (3, 4) and (-1, -8)

*Use the ZOOM features (+, -) to adjust the view until both coordinates are within view.

- 2) Create a SLIDER for $y = mx + b$.

- Type: $y = mx + b$ (no spaces) into entry box
- Click “m” and “b” that appears to input slides
- “PLAY” button allows the sliders to toggle back and forth; moving the slider manually allows you to adjust the location.

*Adjust the values for the slope and y-intercept to approximate the line that contains the two points

- 3) Record your equation in slope intercept form:

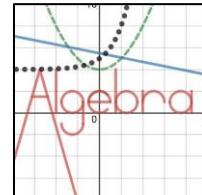
- 4) Using the coordinates, determine the equation ($y = mx + b$) of the line algebraically:

- 5) Rewrite your equation in point-slope form and general form:

Point-Slope Form:

General Form:

- 6) Graph the three equations in Desmos and compare the graphs of all three equations.



ACTIVITY 2: FUNCTIONS

- 1) Graph the following: $f(x) = x^2$ (type as it appears with no spaces)

*Use the ZOOM features or SCREEN GRAB to adjust the view of the graph

- 2) Use Desmos to evaluate the function at $x = 4, 9, 25$.
- In separate entry boxes, type $f(4)$, $f(9)$, and $f(25)$.
 - The calculator will automatically generate the value of the $f(x)$ at the specified value of x .

- 3) Generate a table of values based on the function $g(x) = 3x + 9$. Record your values below:

- Type $f(x) = 3x+9$ into entry box
- Insert table with x , $g(x)$ as column labels
- Select random values of x and Desmos will generate corresponding values in $g(x)$.

x	$g(x)$

- 4) Create a quadratic function slider for $f(x) = ax^2$ to adjust a .

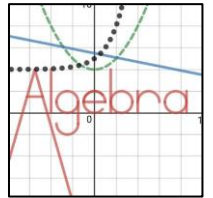
- a. Record observations to explain how adjusting values on the slider affect the graph.

- b. Based on your observations, complete the following sentences:

- When a changes from positive to negative, the graph _____.
- As a increases from 1 to 10, the graph _____.
This is a _____.
- As a decreases from 10 to 1, the graph _____.
This is a _____.



Desmos 101: Algebra I
Charge Up! With Desmos (Beginners)
Session: T-048a (8:00am)



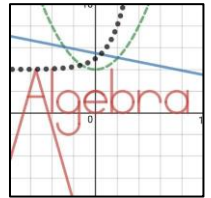
5) Create a quadratic function slider for $f(x) = (bx)^2$ to adjust b .

a. Based on the graph that is generated, what is the beginning value of b and the shape of your graph?

b. Based on your observations, when $b = 0$, describe the graph that is created. Why?

c. Based on your observation, complete the following sentences:

- i. As b increases from 0 to 10, the graph _____.
- ii. As b decreases from 10 to 0, the graph _____.
- iii. As b increases from -10 to 0, the graph _____.
- iv. As b decreases from 0 to -10 the graph _____.



ACTIVITY 3: KEY FEATURES with DESMOS

1) Graph the following linear system: $\begin{cases} -5 = x - 3y \\ 11 = -3x + 7y \end{cases}$

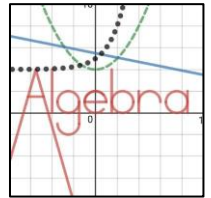
- a. Write the solution as an ordered pair (x, y) and explain how graphing the system helps you to determine the solution to the system

- b. Prove the solution of the graph by solving the system of equations using the substitution method.

- c. Prove the solution of the graph by solving the system of equations using the elimination method.



Desmos 101: Algebra I
Charge Up! With Desmos (Beginners)
Session: T-048a (8:00am)



- 2) A ball was thrown upward into the air. The height, in feet, of the ball above the ground t seconds after being thrown can be determined by the expression $-16t^2 + 40t + 3$.

- a. Does this graph have a maximum or minimum? Where is it located (x, y) ? What does it represent in the context of the problem?

- b. How long does it take the ball to reach the ground? Justify your answer.

- c. Use the graph to rewrite the expression in vertex form. Show that your expression is equivalent to $-16t^2 + 40t + 3$.