



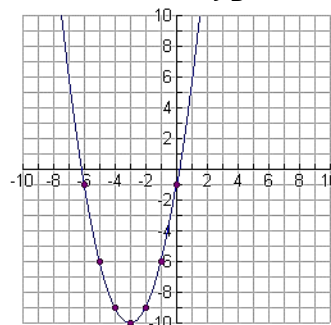
**Target 5C:** Use graphs and tables to compare the output values of linear, quadratic, and exponential functions and compare properties of two differently\* represented functions. (\*algebraically, graphically, numerically in tables, or by verbal descriptions).

11. Find the vertex of each function and determine which has the greatest y-value in the coordinate of its vertex. (1 point)

Function  $f_A$

$$f_A(x) = 5x^2 + 2x + 1$$

Function  $f_B$



12. Select the function that has the greatest y-intercept. (1 point)

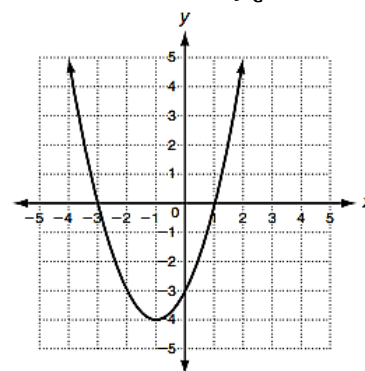
Function  $f_A$

$$f_A = 4^x$$

Function  $f_B$

$x$	-2	-1	0	1	2
$f(x)$	7	0	-5	-8	-9

Function  $f_C$



13. Determine the function that has the greatest output value ( $y$ ) when  $x = -3$ . (1 point)

$$f(x) = 7x + 32$$

$$g(x) = 5^x$$

$$h(x) = x^2 - 2x + 11$$

14. Match the function with the correct table. Then, determine the missing values in the function. (3 points)

**Table A**

$x$	$y$
-2	0
-1	15
0	24
1	27
2	24
3	
4	

**Table B**

$x$	$y$
-2	$\frac{1}{4}$
-1	$\frac{1}{2}$
0	1
1	
2	
3	8
4	16

**Table C**

$x$	$y$
0	-1
1	2
2	
3	8
4	11
5	

$f(x) = 2^x$ : Table \_\_\_\_\_

$g(x) = 3x - 1$ : Table \_\_\_\_\_

$h(x) = -3(x + 2)(x - 4)$ : Table \_\_\_\_\_

15. Superman, Batman, and Iron Man are racing through the city toward the shoreline. Use the properties of the equations for Superman  $d = 3^t$ , Batman  $d = t^4$ , and Iron Man  $d = 7t$ , to explain their speeds in the following time intervals, where  $t$  is time in minutes and  $d$  is distance. (3 points)

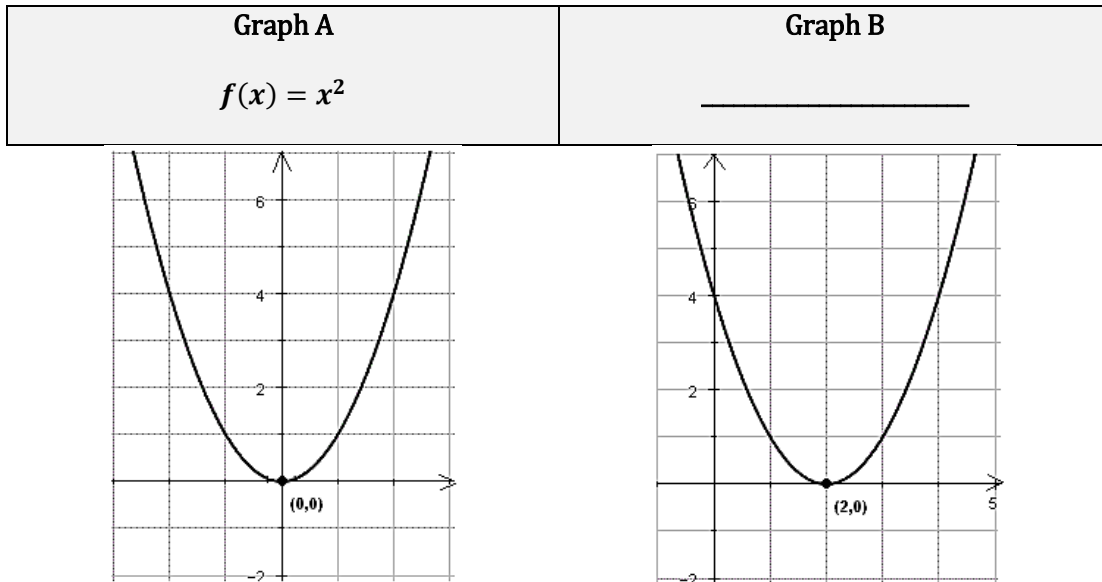
	Superman $d = 3^t$	Batman $d = t^4$	Iron Man $d = 7t$
$0 \leq t < 1$			
$1 \leq t < 2$			
$2 \leq t < 3$			

Is there a point when there is a 3 way tie? If so, when is this?

If the shoreline is far away, who will get there first? Why?

**Target 5D:** Transform graphs based on changes in equations and write equations based on a translation of a parent graph.

16. Identify the transformation from graph A to graph B. Write the function of Graph B in the space provided. (1 point)



17. Describe the transformation of  $f(x) = 7^{(x-8)}$  from the parent function  $f(x) = 7^x$ . (1 point)

18. Transform the parent function  $f(x) = x^2$  by shifting 10 units down and 8 units right. (1 point)

19. The function  $y = x^2$  has its vertex at  $(0, 0)$ . Write the standard form equation that results if  $y = x^2$  is shifted to the right by 5 units and up by 6 units. What are the new coordinates of the vertex? (3 points)

$$y = (x - h)^2 + k$$

20. Consider the relationship between Fahrenheit and Kelvin temperatures. Using your graphing calculator, graph these two functions on the same set of axes: (3 points)

*(Ti Nspire: Menu: 6: Analyze Graph, 4: Intersection)*

$$f_1 = x$$

$$f_2 = \frac{5}{9}(x - 32) + 273$$

a) Describe in transformational terms, how the first graph becomes the second graph.

b) At what temperature are the Fahrenheit and Kelvin readings the same?

**ADVANCED (10 possible points)**

On the grid are eight points from two different functions.  
A linear function passes through exactly four of the points shown.  
A quadratic function passes through the remaining four points.

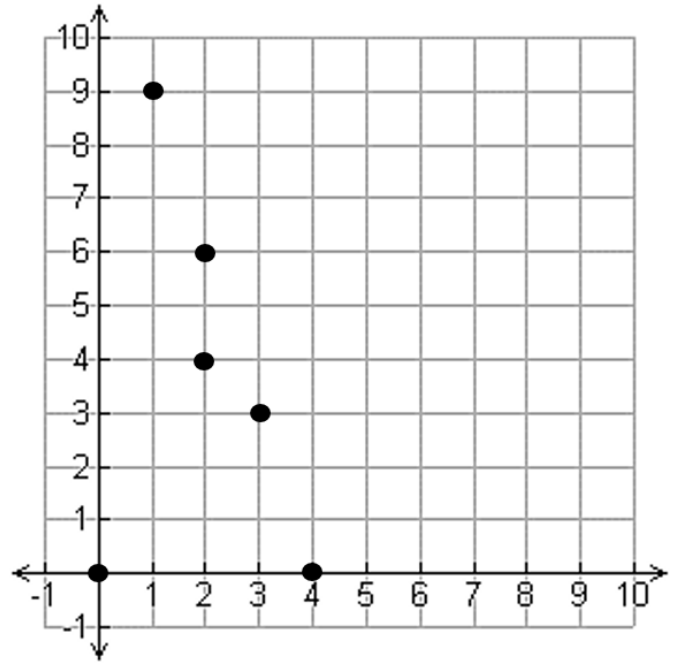
For the **linear** function:

1. Write the coordinate pairs of its four points:

\_\_\_\_\_, \_\_\_\_\_,  
\_\_\_\_\_, \_\_\_\_\_

Draw the line on the grid.

2. Write an equation for the function. Show your work.



For the **quadratic** function:

3. Write the coordinate pairs of its four points:

\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

Draw the graph of the function on the grid.

4. Write an equation that fits the quadratic function. Show your work.