Integrated Math 2
Key Concept 5 REVIEW

REVIEW

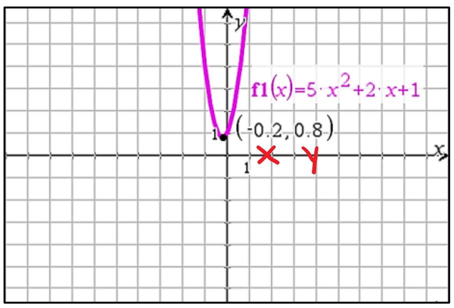
Name: Inked Copy
Period: ____________

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

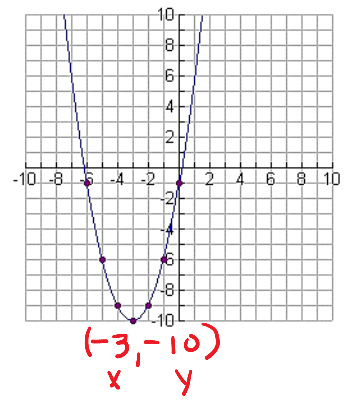
$f_A(x) = 5x^2 + 2x + 1$



0.8 > −10

$\boxed{\text{Function } f_A}$

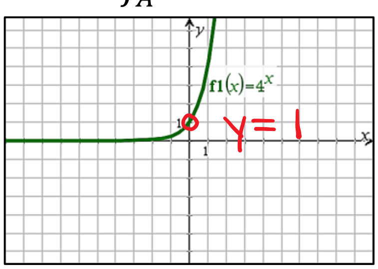
Function f_B



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

$\boxed{\textbf{Function } f_A}$

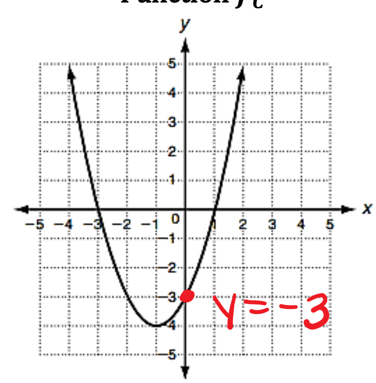
$f_A = 4^x$



Function f_B y = −5

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 $\boxed{x = -3.}$ (1 point)

$f(x) = 7x + 32$

$f(-3) = 7(-3) + 32$

$f(-3) = 11$

$g(x) = 5^x$

$g(-3) = 5^{(-3)}$

$g(-3) = \frac{1}{125}$

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

$h(-3) = (-3)^2 - 2(-3) + 11$

$\boxed{h(-3) = 26}$

GREATEST

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	**15**
4	**0**

Table B

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

Table C

x	y
0	-1
1	2
2	**5**
3	8
4	11
5	**14**

*Plug in x-values to get y-values!

$f(x) = 2^x$: Table **B**

$g(x) = 3x - 1$: Table **C**

$h(x) = -3(x + 2)(x - 4)$: Table **A**

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 $d = 7t$
$0 \le t < 1$	$3^0 = 1$ | $3^1 = 3$ $\mathbf{1 \le d < 3}$	$0^4 = 0$ | $1^4 = 1$ $\mathbf{0 \le d < 1}$	$7(\mathbf{0}) = 0$ | $7(\mathbf{1}) = 7$ $\mathbf{0 \le d < 7}$
$1 \le t < 2$	$3^1 = 3$ | $3^2 = 9$ $\mathbf{3 \le d < 9}$	$1^4 = 1$ | $2^4 = 16$ $\mathbf{1 \le d < 16}$	$7(\mathbf{1}) = 7$ | $7(\mathbf{2}) = 14$ $\mathbf{7 \le d < 14}$
$2 \le t < 3$	$3^2 = 9$ | $3^3 = 27$ $\mathbf{9 \le d < 27}$	$2^4 = 16$ | $3^4 = 81$ $\mathbf{16 \le d < 81}$	$7(\mathbf{2}) = 14$ | $7(\mathbf{3}) = 21$ $\mathbf{14 \le d < 21}$

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

NO. All superheroes are at a different distance for every time interval.

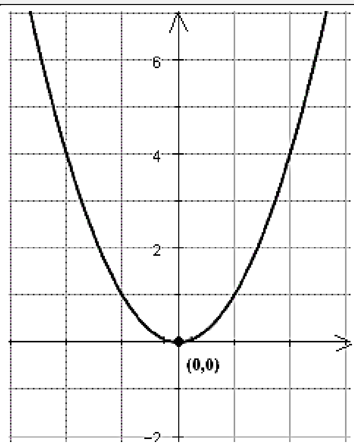
If the shoreline is far away, who will get there first? Why?

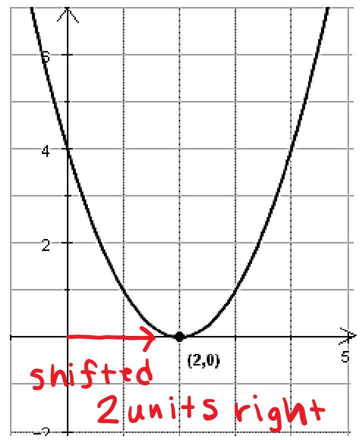
SUPERMAN. Exponential functions grow faster over time.

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)

Graph A	Graph B
$f(x) = x^2$	$f(x) = (x - 2)^2$





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

Translated 8 units to the right.

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

$f(x) = (x - 8)^2 - 10$

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)

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

$y = (x-5)^2 + 6$ $\boxed{\text{New vertex: } (5,6)}$

$y = \underbrace{x^2 - 5x - 5x}\underbrace{+25 + 6}$

$\boxed{y = x^2 - 10x + 31}$

	x	-5
x	x^2	$-5x$
-5	$-5x$	$+25$

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)

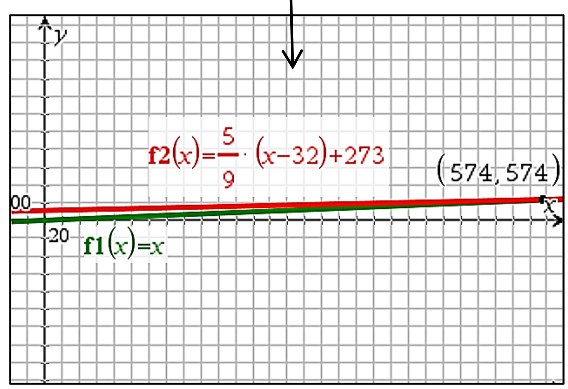
$$f_1 = x$$

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

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

Vertical stretch of a factor of $\frac{5}{9}$

Translation of 32 units right and 273 units up



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

(574, 574)

574°F is equal to 574 K.

ADVANCED (10 possible points)

On the grid are eight points from two different functions.

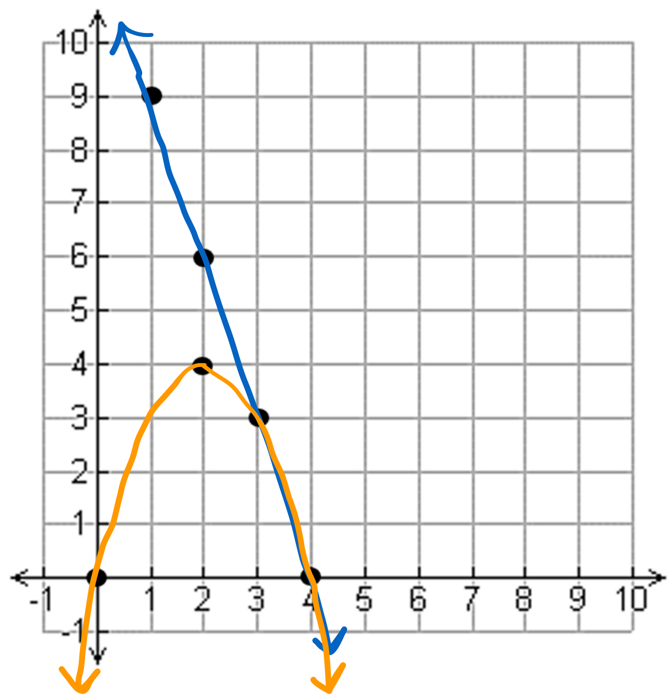
A linear function passes through exactly four of the points shown.

A quadratic function passes through the remaining four points.

For the **linear** function:

1. Write the coordinate pairs of its four points:

$$(1, 9), (2, 6), (3, 3), (4, 0)$$



Draw the line on the grid.

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

$m = -3$

$y = -3x + b$ (pick an x,y to get "b")

$9 = -3(1) + b$

$9 = \cancel{-3} + b$

$+3 \quad \cancel{+3}$

$12 = b$

$y = mx + b$

$\boxed{y = -3x + 12}$

For the **quadratic** function:

3. Write the coordinate pairs of its five points:

x y h,k

$$(0, 0), (2, 4), (3, 3), (4, 0)$$

↑ vertex

Draw the graph of the function on the grid.

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

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

$y = a(x-2)^2 + 4$ (pick an x,y to get "a")

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

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

$0 = 4a + \cancel{4}$

$-4 \quad \cancel{-4}$

$\frac{-4}{4} = \frac{\cancel{4}a}{\cancel{4}}$

$-1 = a$

$\boxed{y = -1(x-2)^2 + 4}$