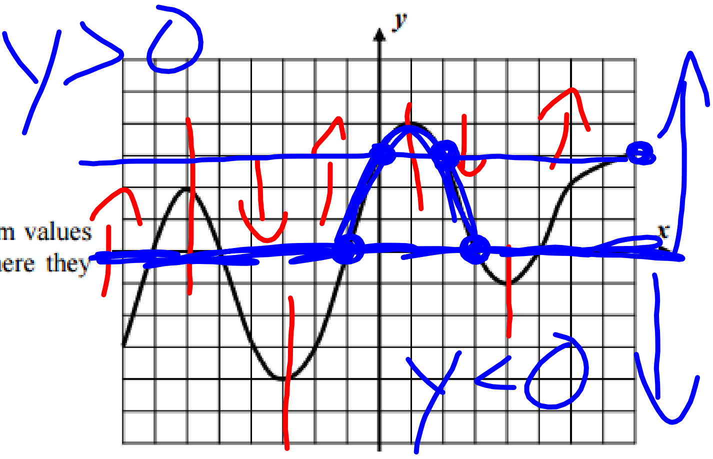
FLUENCY

1. The function $y = f(x)$ is shown graphed below over the interval $-8 \le x \le 8$.

(a) Evaluate each of the following;

$f(-2) = -3$ $f(8) = 3$

$f(-8) = -3$ $f(4) = -1$



(b) Find all the relative maximum and minimum values of the function. State the values of x where they occur as well.

R. Max
(-6, 2)
(1, 4)

R. min
(4, -1)
(-3, -4)

(c) What are the absolute maximum and absolute minimum values of the function? At what x-values do they occur?

(1, 4) (-3, -4)

(d) What are the x and y-intercept(s) of the function? List each of the following as an ordered pair (x, y).

x-intercept(s): (-7,0)(-5,0)(-1,0)
(zeroes) (3,0)(5,0)

y-intercept(s): (0, 3)

(e) Give an interval over which the function is increasing. Give an interval over which it is decreasing.

Increasing: $-8 \leq x \leq -6$

Decreasing: $-6 \leq x \leq -3$

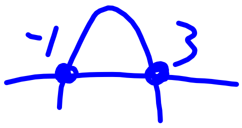
(f) Use your graph to find all solutions to the equation $f(x) = 3$. Illustrate your solution graphically.

0, 2, 8

(g) Is the function positive or negative on the interval $-1 < x < 3$? How can you quickly tell?

POSITIVE

THE CURVE IS ABOVE THE X-AXIS.



APPLICATIONS

2. The following graph shows the height, h, above the ground of a toy rocket t seconds after it was fired. Use the graph of $h(t)$ to answer the following questions.

(a) What was the maximum height the rocket reached? After how many seconds?

190meters 6seconds

(b) How many seconds was the rocket in flight?

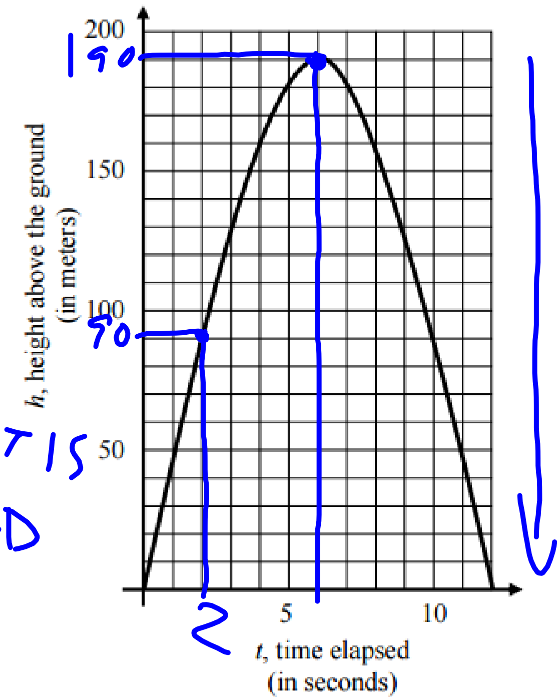
12

(c) Interpret $h(2) = 90$.

AT 2 SECONDS, THE ROCKET IS 90m OFF THE GROUND

(d) Give the interval for t over which the height of the rocket is decreasing.

$6 \leq x \leq 12$



REASONING

3. On the following set of axis, create the graph of a function $f(x)$ with the following characteristics:

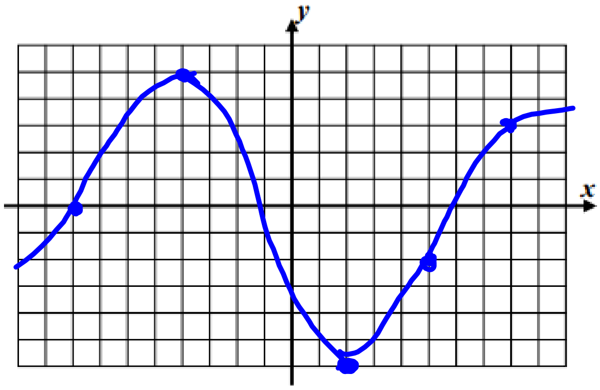
Passes through the points,

$(-8,0)$, $(5,-2)$ and $(8,3)$

Has an absolute maximum at $f(-4)=5$

Has an absolute minimum at $f(2)=-6$

Decreasing on the interval on the interval $-4 \le x \le 2$



Bell Ringer:

The value in dollars, $v(x)$, of a certain car after x years is represented by the equation $v(x) = 25,000(0.86)^x$. To the *nearest dollar*, how much more is the car worth after 2 years than after 3 years?

1) 2589 2588.6
2) 6510
3) 15,901
4) 18,490

18490 (2 yrs)
- 15901 (3yrs)

2589

Unit 3 Quick Review:

Which relation is *not* a function?

~~1) $\{(2,4),(1,2),(0,0),(-1,2),(-2,4)\}$~~

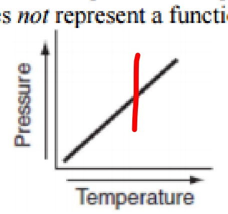
~~2) $\{(2,4),(1,1),(0,0),(-1,1),(-2,4)\}$~~

~~3) $\{(2,2),(1,1),(0,0),(-1,1),(-2,2)\}$~~

4) $\{(2,2),(1,1),(0,0),(1,-1),(2,-2)\}$

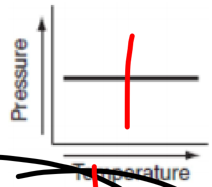
Each graph below represents a possible relationship between temperature and pressure. Which graph does *not* represent a function?

1)



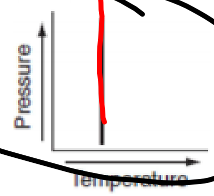
1)

2)



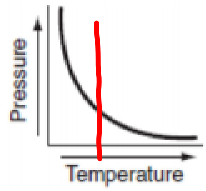
2)

3)



3)

4)



4)

Exploring Functions Using the Graphing Calculator
Common Core Algebra I

Graphing calculators are powerful tools in our exploration of functions and the rules that define them. Because calculators are so good at doing calculations, it is fairly easy to have them evaluate **expressions** that are the **rules** for generating the **outputs** for the functions. Throughout this entire lesson, we will assume that you have a calculator that can do the following:

Graphing Calculator Essentials

1. A Table App AND 2. A Graphing App

We can use our calculator to help us produce tables that are very useful in plotting graphs and exploring functions.

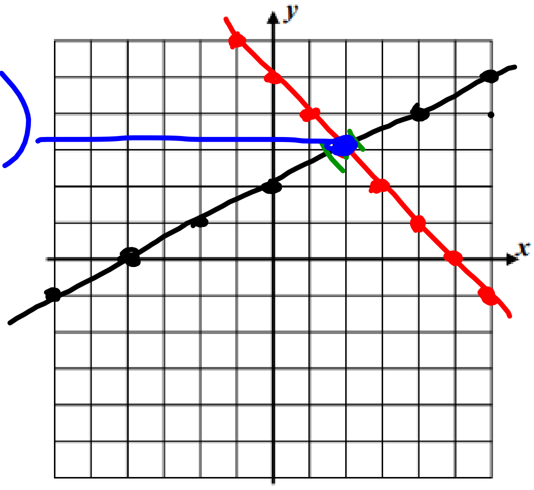
***Exercise* #1:** Consider the linear function $f(x) = \frac{1}{2}x + 2$. Do the following by using your graphing calculator's table function.

(a) Evaluate $f(-6)$, $f(0)$ and $f(8)$.

$-1 \quad 2 \quad 6$

x, y

$(2, 3)$



(b) Explore the table to determine the value of x for which $f(x) = 11$.

18

(c) Use the table to fill out the following table and graph the function on the grid for the interval $-6 \le x \le 6$.

x	y	(x, y)
−6	−1	−6, −1
−4	0	−4, 0
−2	1	−2, 1
0	2	0, 2
2	3	2, 3
4	4	4, 4
6	5	6, 5

(d) Graph the linear function $g(x) = 5 - x$ on the same set of axes and find where the two lines intersect.

(e) Show that the point that you found in (d) is a solution to both equations:

$y = \frac{1}{2}x + 2$ and $y = 5 - x$

$3 = \frac{1}{2}(2) + 2$

$3 = 1 + 2$

$3 = 3$ ✓

$3 = 5 - 2$

$3 = 3$ ✓

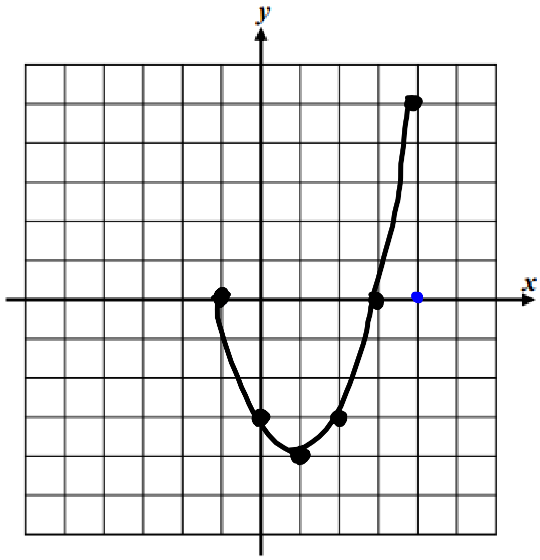
The calculator can do the heavy lifting with the calculations, while we examine the results. Always be careful when entering algebraic expressions on your calculator. Let's take a look at a **quadratic function** using the graphing calculator.

***Exercise* #2:** Consider the function $y=(x-1)^2-4$ over the interval $-1 \le x \le 4$. Do the following with the use of tables on your graphing calculator.

(a) Create a table of values for this function over the specified interval.

-1	0
0	-3
1	-4
2	-3
3	0
4	5

(b) Create a sketch of this function over this interval. Verify by examining the graph that your calculator produces.



(c) What are the function's minimum and maximum values on this interval?

-4

5

(d) Over what interval is the function negative?

$-1 < x < 3$

(e) For your graph, state the interval over which the function is increasing.

$1 \le x \le 4$

(f) How can this graph help to solve the equation $(x-1)^2-4=-3$? Can you solve this by looking at your table?

YES. LOOK TO THE TABLE, LOCATE THE X-VALUE WHEN THE Y-VALUE IS -3.

***Exercise* #3:** Which of the following is a point where $y=\frac{3}{2}x+7$ and $y=-5x-6$ intersect?

(1) $(0,7)$ (3) $(-2,4)$

(2) $(-1,-1)$ (4) $(2,10)$

$$\frac{3}{2}x+7=-5x+6-7$$

$$-7 \qquad +5x$$

$$+5x$$

$$\frac{6.5x}{6.5}=\frac{-13}{6.5}$$

$$x=-\cancel{13}\cdot\frac{2}{\cancel{13}}=-2$$