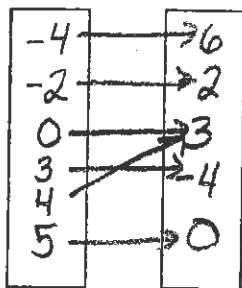
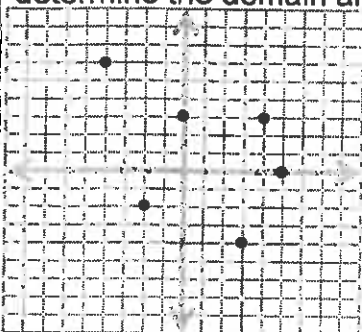


3.4 Notes
Graphing Functions

Name _____

Starter Problems

A. Use the graph to create a table of values for the relation. Then, create a mapping, determine the domain and range, and determine if the relation is a function.



x	y
-4	6
-2	-2
0	3
3	-4
4	3
5	0

Domain: $\{-4, -2, 0, 3, 4, 5\}$

Range: $\{-4, -2, 0, 3, 6\}$

Function? Yes

B. Evaluate the function at the given x values (the domain), and complete a table of values. Plot the points on the graph. Show your work for plugging in each value of the domain:

$f(x) = -4x + 2$ Domain: $\{-2, -1, 0, 1, 2\}$

Will this graph be discrete or continuous?

x	y
-2	10
-1	6
0	2
1	-2
2	-6

$f(-2) = -4(-2) + 2 = 8 + 2 = 10$

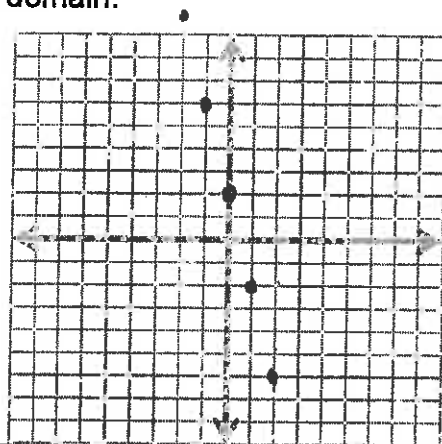
$f(-1) = -4(-1) + 2 = 4 + 2 = 6$

$f(0) = -4(0) + 2 = 0 + 2 = 2$

$f(1) = -4(1) + 2 = -4 + 2 = -2$

$f(2) = -4(2) + 2 = -8 + 2 = -6$

What is the range? $\{-6, -2, 2, 6, 10\}$



One way to better understand a function and its features is to graph it, which you can do by finding ordered pairs. If the output (y or f(x)) is not already isolated in a function, it is a good idea to isolate it before plugging in points.

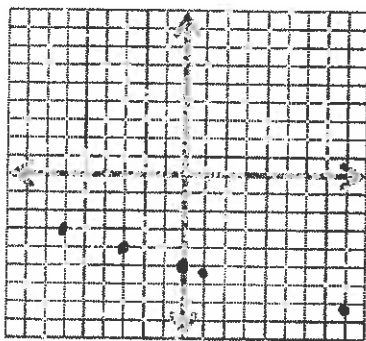
Examples- graph the function over the given domain.

1. $x + 3y = -15$ Domain: $\{-6, -3, 0, 1, 8\}$

$$\frac{3y}{3} = \frac{-x - 15}{3}$$

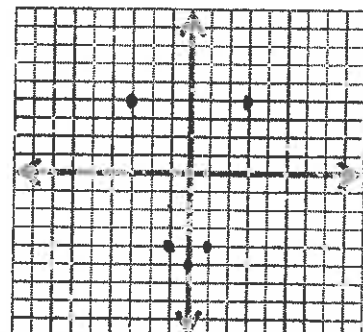
$$y = -\frac{1}{3}x - 5$$

x	y
-6	-3
-3	-4
0	-5
1	$-5\frac{1}{3}$
8	$-\frac{23}{3}$



2. $f(x) = x^2 - 5$ Domain: $\{-3, -1, 0, 1, 3\}$

x	y
-3	4
-1	-4
0	-5
1	-4
3	4

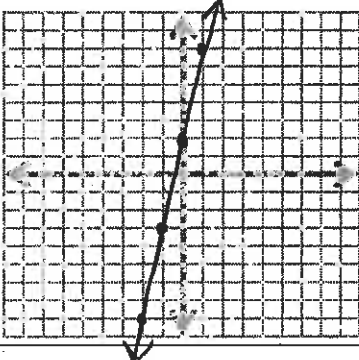
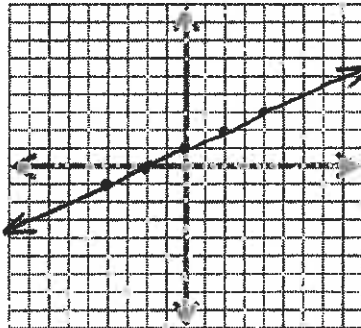
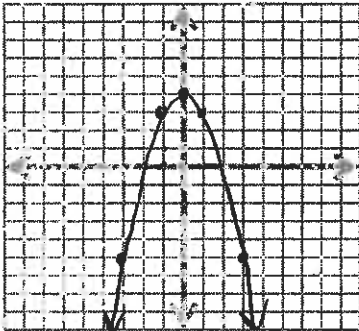
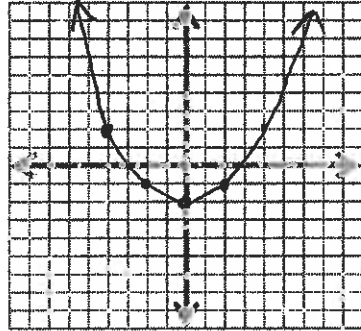


If a domain is not provided for a function, at this time it should be assumed that the domain is all real numbers- meaning any number can be used as an input value. Since there are an infinite number of ordered pairs that satisfy the function, a smooth line or curve connects individual values and arrowheads are drawn at both ends.

Graphing functions using a domain of all real numbers

1. Solve the function for the output, if not already done.
2. Use the function to generate ordered pairs by choosing several values for x.
3. Plot enough points to see a pattern for the graph.
4. Connect the points with a line or smooth curve and draw arrowheads at each end.

Examples- Graph each function by creating a table of values. Then use the graph to determine the value of f at the given input.

<p>3. $y - 5x = 2$ What is $f(-3)$?</p> <table style="display: inline-table; border-collapse: collapse; margin-right: 20px;"> <tr><td style="border-right: 1px solid black; padding: 5px;">x</td><td style="padding: 5px;">y</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">-2</td><td style="padding: 5px;">-8</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">-1</td><td style="padding: 5px;">-3</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">0</td><td style="padding: 5px;">2</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">1</td><td style="padding: 5px;">7</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">2</td><td style="padding: 5px;">12</td></tr> </table> <div style="display: inline-block; vertical-align: top;"> $y - 5x = 2$ $+5x \quad +5x$ $y = 5x + 2$ $f(-3) = -13$ </div> 	x	y	-2	-8	-1	-3	0	2	1	7	2	12	<p>4. $x - 2y = -2$ What is $f(0)$?</p> <table style="display: inline-table; border-collapse: collapse; margin-right: 20px;"> <tr><td style="border-right: 1px solid black; padding: 5px;">x</td><td style="padding: 5px;">y</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">-4</td><td style="padding: 5px;">-1</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">-2</td><td style="padding: 5px;">0</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">0</td><td style="padding: 5px;">1</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">2</td><td style="padding: 5px;">2</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">4</td><td style="padding: 5px;">3</td></tr> </table> <div style="display: inline-block; vertical-align: top;"> $x - 2y = -2$ $-x \quad -x$ $\frac{-x}{-2} = \frac{-x}{-2} - \frac{2}{-2}$ $y = \frac{1}{2}x + 1$ $f(0) = 1$ </div> 	x	y	-4	-1	-2	0	0	1	2	2	4	3
x	y																								
-2	-8																								
-1	-3																								
0	2																								
1	7																								
2	12																								
x	y																								
-4	-1																								
-2	0																								
0	1																								
2	2																								
4	3																								
<p>5. $f(x) = -x^2 + 4$ What is $f(-3)$?</p> <table style="display: inline-table; border-collapse: collapse; margin-right: 20px;"> <tr><td style="border-right: 1px solid black; padding: 5px;">x</td><td style="padding: 5px;">y</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">-3</td><td style="padding: 5px;">-5</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">-1</td><td style="padding: 5px;">3</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">0</td><td style="padding: 5px;">4</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">1</td><td style="padding: 5px;">3</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">3</td><td style="padding: 5px;">-5</td></tr> </table> <div style="display: inline-block; vertical-align: top;"> $f(-3) = -5$ </div> 	x	y	-3	-5	-1	3	0	4	1	3	3	-5	<p>6. $4y = x^2 - 8$ What is $f(4)$?</p> <table style="display: inline-table; border-collapse: collapse; margin-right: 20px;"> <tr><td style="border-right: 1px solid black; padding: 5px;">x</td><td style="padding: 5px;">y</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">-4</td><td style="padding: 5px;">2</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">-2</td><td style="padding: 5px;">-1</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">0</td><td style="padding: 5px;">-2</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">2</td><td style="padding: 5px;">-1</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px;">4</td><td style="padding: 5px;">2</td></tr> </table> <div style="display: inline-block; vertical-align: top;"> $4y = x^2 - 8$ $y = \frac{1}{4}x^2 - 2$ </div> 	x	y	-4	2	-2	-1	0	-2	2	-1	4	2
x	y																								
-3	-5																								
-1	3																								
0	4																								
1	3																								
3	-5																								
x	y																								
-4	2																								
-2	-1																								
0	-2																								
2	-1																								
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