

U3, D3 – DETERMINE AND INTERPRET INTERCEPTS

Objective: Given an equation, I will determine and interpret the intercepts of a linear function/equation.

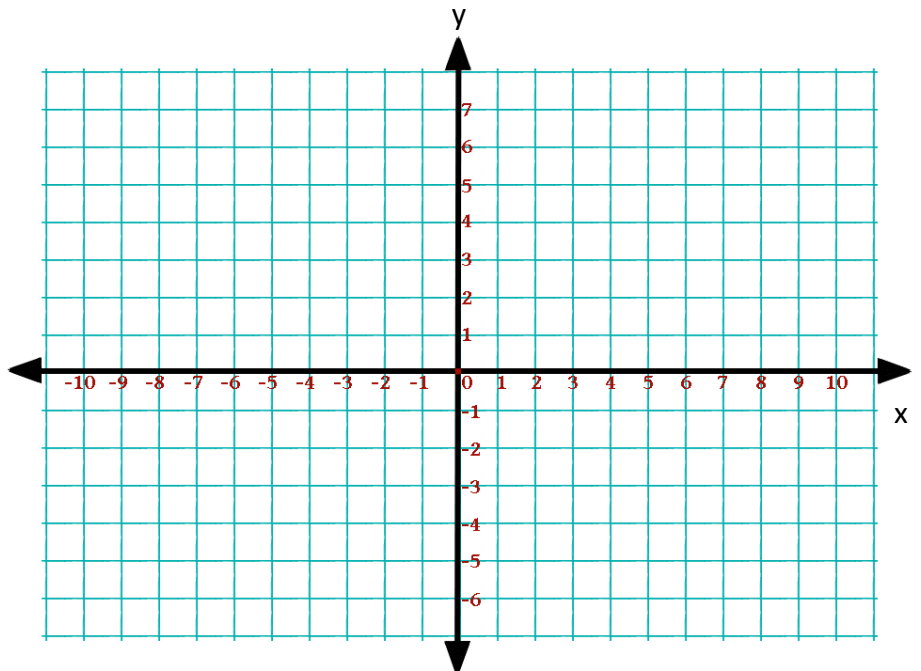
Big Idea: The intercepts of a linear function (or equation) are the values when $x = 0$ and $y = 0$.

Think About It: Given the function $f(x) = -\frac{1}{2}x + 4$, determine where the function will intercept the y-axis and the x-axis. The use of the coordinate grid is not required to solve.

To find x-intercept substitute $\underline{\hspace{1cm}} = \underline{\hspace{1cm}}$ and solve for $\underline{\hspace{1cm}}$

To find y-intercept substitute $\underline{\hspace{1cm}} = \underline{\hspace{1cm}}$ and solve for $\underline{\hspace{1cm}}$

Using graph to find x and y-intercepts:



CFS:

1. Important information is highlighted and question/prompt is circled
2. Intercepts are solved algebraically (*using equation*) by substituting zero for inputs (x) and outputs (y or $f(x)$)
3. If provided, intercepts are given meaning in context
4. If provided, intercepts are checked graphically (*using coordinate grid*)

Partner Practice: (*Low Difficulty*)

1. Determine the x and y intercepts of the following functions and equations:

a. $y = 3x - 6$

x-intercept:**y-intercept:****Answer:**

b. $y = \frac{1}{2}x - 3$

x-intercept:**y-intercept:****Answer:**

c. $f(x) = -3x + 9$

x-intercept:**y-intercept:****Answer:**

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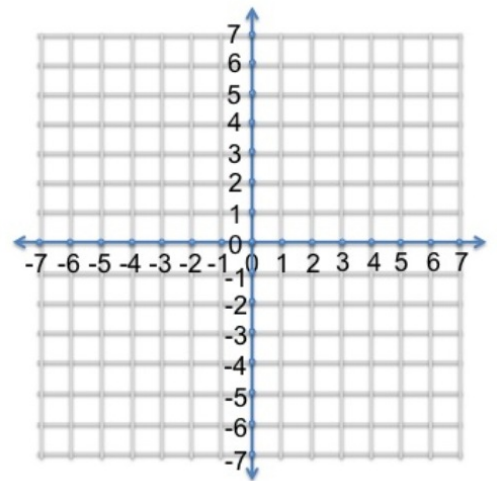
$$d. \quad g(x) = -\frac{1}{2}x - 2$$

x-intercept:**y-intercept:****Answer:**

$$e. \quad 3x + 4y = 1$$

x-intercept:**y-intercept:****Answer:**

2. Given the equation $y = -x + 3$, will the x or y-intercept change if the slope is changed? Explain and prove your answer is correct by picking a new rate of change and graphing.



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Partner Practice: *(Medium Difficulty)*

3. Given the equation $4x + 2y = 8$, describe what happens to the x and y intercepts if the slope is doubled. Show all your work and be specific in your explanation.

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4. An airplane is on its final decent into an airport. It begins its decent at 1000 feet in the air and descends at a constant rate of 3 feet per second. Write a function that describes the height of the plane, $f(x)$, as a function of the number of seconds that have passed, x , and use it to determine the x and y intercepts. Explain what the intercepts mean given the context and describe the domain and range of the situation.

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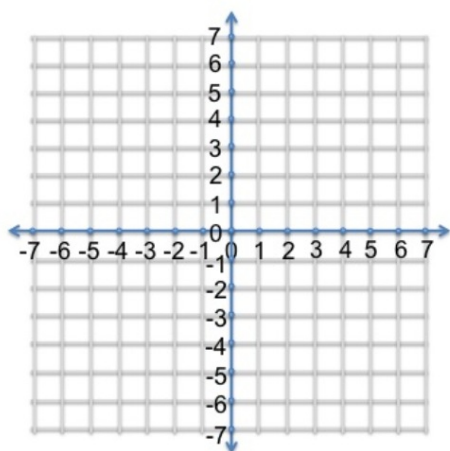
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5. Michael is growing rosemary in his backyard and records how fast it is growing. He started his measurements when the plant was three inches tall. He determined that the rosemary was growing at a rate of $\frac{1}{2}$ inch per day. Write a function of the height of the rosemary as a function of the number of days that have passed. Determine the intercepts algebraically and graph the results to check. Do both intercepts make sense given the context? Explain.

Function: _____

x- and y-intercepts:



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Partner Practice: (*Hard Difficulty*)

6. Justin goes over to the water cooler at work, which currently has 20 liters of water in it. He goes to fill up his water bottle but when he tries to turn the knob, it breaks off and starts to leak water at a constant rate of 0.4 liters per second. Write a function that describes the volume of water in the cooler, $f(x)$, as a function of how much time has passed in seconds, x . Use your function to determine the intercepts of the function and their meaning given the context. What are the domain and range of the real-world situation?

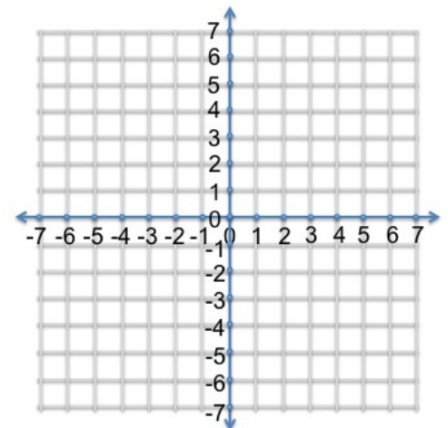
Function: _____	
x- and y-intercepts:	<div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 5px;"></div>

7. The function $f(x) = x^2 - 4$ is not a linear function.

Step A: Attempt to find the x and y-intercepts using the same methods in this lesson.

Step B: Complete the table below and graph the function to check your work.

x	$f(x)$
-3	
-2	
-1	
0	
1	
2	
3	



Step C: Why do your x and y-intercepts make sense given your algebraic work?

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