



Unit 6: Lesson 06

Putting it all together: interpreting linear graphs

Another shortcut:

Consider the solution to $3y = 4x + 7$: divide both sides by 3.

$$\begin{aligned}
 3y &= 4x + 7 \\
 \frac{3y}{3} &= \frac{4x}{3} + \frac{7}{3} \\
 y &= \frac{4x}{3} + \frac{7}{3}
 \end{aligned}$$

Notice that **y winds up by itself** and the **3 winds up in the denominator** of all the other terms.

As a short cut, in the future we will **just think of moving the 3 to the denominators of all the other terms.**

$$\begin{aligned}
 3y &= 4x + 7 \\
 y &= \frac{4x}{3} + \frac{7}{3}
 \end{aligned}$$

Example 1: Solve $9y = 11x - 1$ for y .

$$\begin{aligned}
 9y &= 11x - 1 \\
 y &= \frac{11x}{9} - \frac{1}{9}
 \end{aligned}$$

Example 2: Solve $4x - 5y = 7$ for y .

$$\begin{aligned}
 4x - 5y &= 7 \\
 -5y &= -4x + 7 \\
 y &= \frac{-4x}{-5} + \frac{7}{-5} \\
 y &= \frac{4x}{5} - \frac{7}{5}
 \end{aligned}$$

Example 3: Assuming that $(x, 2)$ is a solution to the linear function $y = x - 12$, what is the value of x ?

$$\begin{aligned}
 y &= x - 12 \\
 2 &= x - 12 \\
 x - 12 &= 2 \\
 x &= 2 + 12 \\
 x &= 14
 \end{aligned}$$

Example 4: Determine the value of a when the line passing through $(4, a)$ and $(-3, -2)$ has a slope of -2 .

$$(x_1, y_1) = (4, a) \quad (x_2, y_2) = (-3, -2)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{-2}{1} = \frac{-2 - a}{-3 - 4} \quad \text{cross multiply}$$

$$-2 - a = -2(-3 - 4)$$

$$-a = 14 + 2$$

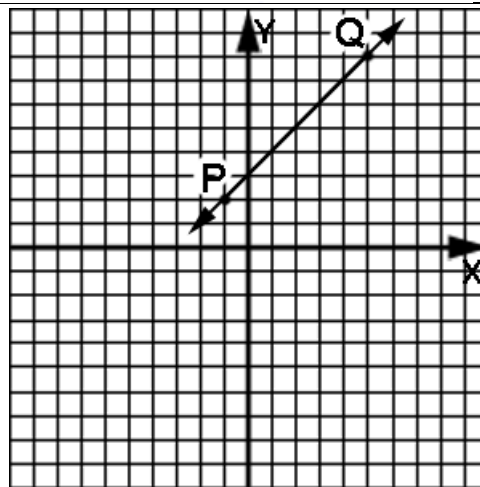
$$-2 - a = -2(-7)$$

$$-1a = 16$$

$$-2 - a = 14$$

$$a = \frac{16}{-1} = \boxed{-16}$$

Use this drawing in Examples 5 – 8.



Example 5: Just from the graph, what appears to be the value of the function at $x = 2$?

5

Example 6: Just from the graph, when the value of the function is 7, what appears to be the corresponding x -value?

4

Example 7: What quadrants are touched by this line?

I, II, III

Example 8: What is the equation of a vertical line through point P?

$y = -1$

Assignment:

1. Solve $-2y = 8x + 7$ for y .

2. Solve $x + 19y - 14 = 0$ for y .

3. Solve $23x - 7z = p$ for z .

4. Solve $100y - 6 = x$ for y .

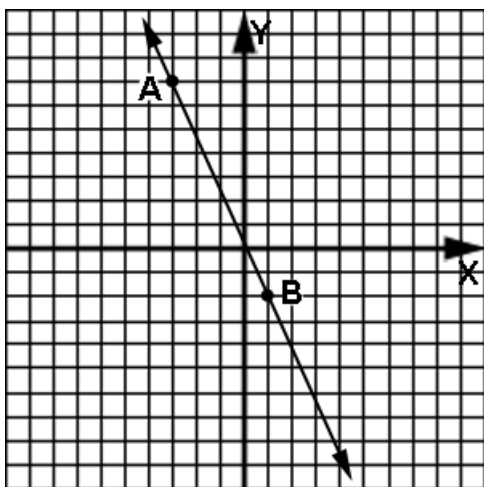
5. Assuming that $(x, -2)$ is a solution to the linear function $x = y - 12$, what is the value of x ?

6. If $(11, y)$ is a solution to the linear function $4x = 5y - 12$, what is the value of y ?

7. Determine the value of a when the line passing through $(8, a)$ and $(10, 0)$ has a slope of 7.

8. Determine the value of b when the line passing through $(12, -7)$ and $(b, -3)$ has a slope of -5 .

Use the linear function shown here to answer questions 9-20.



9. Using the points A & B, what is the exact slope of the line?

10. Using points A & B, what is the exact equation of the line?

11. Just from the graph, what appears to be the y-intercept?	12. From the answer to problem 10, what is the exact y-intercept?
13. Which of the two answers in problems 11 & 12 is most trustworthy? Why?	14. Just from the graph, what appears to be the value of the function when $x = -1$?
15. Just from the graph, when the value of the function is 6, what appears to be the corresponding x value?	16. If the exact y-intercept is used, what quadrants are touched by the line?
17. Using the exact equation of problem 10, evaluate $f(-4)$.	18. What is the equation of a vertical line through point A?
19. What is the equation of a horizontal line through point B?	20. Would the slope of a line drawn perpendicular to the one shown have a positive or negative slope?