

U6D7_T Linear Systems

Thursday, April 26, 2018 10:33 AM



U6D7_T
Linear Sys...

U6D7 Warm Up:

Determine the equation of a line passing through (-2, -3) and (-1, 1).

$$m = \frac{1 - (-3)}{-1 - (-2)} \checkmark = \frac{1+3}{-1+2} = 4 \checkmark$$
$$mx + b = y$$
$$4(-1) + b = 1 \checkmark$$
$$-4 + b = 1$$
$$b = 5 \checkmark$$
$$\therefore \boxed{y = 4x + 5} \checkmark$$

Wrong answer worth 4 out of 5

$$m = \frac{1-3}{-1-2} \times = \frac{-2}{-3} = \frac{2}{3}$$

$$mx + b = 5$$
$$\frac{2}{3}(-1) + b = 1 \checkmark$$
$$-\frac{2}{3} + b = \frac{3}{3}$$
$$b = \frac{5}{3} \checkmark$$
$$\therefore y = \frac{2}{3}x + \frac{5}{3} \checkmark$$

wrong but correct based on previous error

U6D7

Linear Systems (6.7)

Linear system – The comparison of two or more linear relations.

Point of intersection – The point where two (or more) lines cross (or intersect).

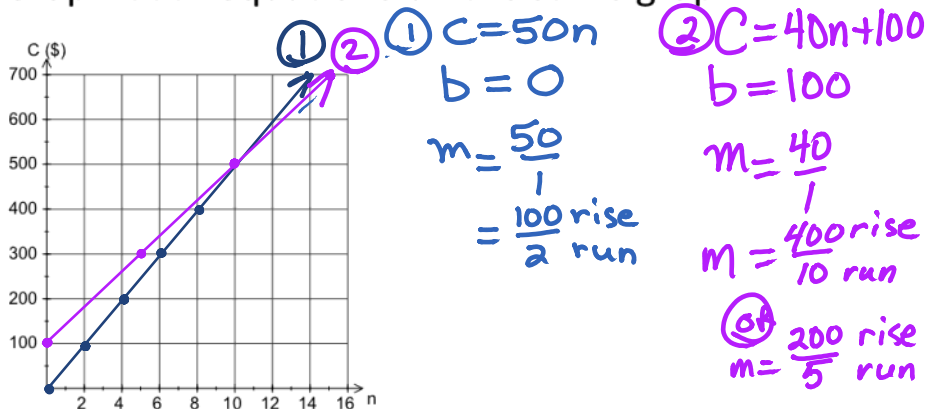


Word Problem: Mike wants to join a ski club for the winter. He is considering the Standard Rate (\$50 per day) and the Frequent Extremist (\$100 registration plus \$40 per day).

a. Write an equation that relates the total cost to the number of days for both payment options.

Standard $C = 50n$ where C is the total cost, n is the number of days.
 Freq. Ext. $C = 40n + 100$

b. Graph both equations on the same graph.

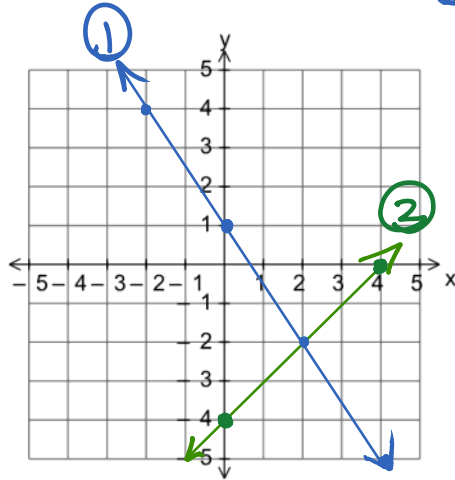


c. When do both options cost Mike the same amount? Both options cost \$500 on day 10.

d. Which payment option should Mike choose?
 If he plans to ski less than 10 days he should pay the standard rate. Otherwise, he should choose the "Frequent Extremist" plan.

Example 1 Graph the following lines and identify the point of intersection. ① $y = -\frac{3}{2}x + 1$ and ② $x - y = 4$

Verify your solution.



① $b = 1$

$m = -\frac{3}{2}$ down 3
right 2

OR $\frac{3}{-2}$ up 3
left 2

② $x - y = 4$

$\frac{x - \text{int}}{x} = 4$
 $x = 4$

$\frac{y - \text{int}}{-y} = 4$
 $-y = 4$
 $y = -4$

$\therefore (x, y) = (2, -2)$

check

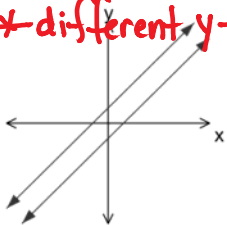
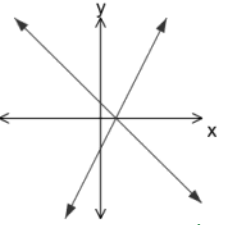
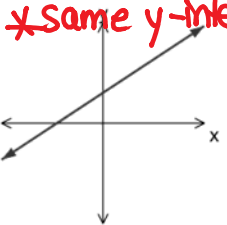
① LS	RS
y	$-\frac{3}{2}x + 1$
-2	$-\frac{3}{2}(2) + 1$
	$= -3 + 1$
	$= -2$

✓

② LS	RS
$x - y$	4
$(2) - (-2)$	
$= 2 + 2$	
$= 4$	

✓

Example 2 How many different solutions are there to a linear system of two equations?

<p>Case #1 – two parallel lines <i>* same slope</i> <i>* different y-int.</i></p>  <p><i>* no solution (no points of intersection).</i></p> <p><u>TYPE OF SYSTEM</u></p> <p>Parallel & Distinct</p>	<p>Case #2 – two non-parallel lines <i>* different slopes</i></p>  <p><i>* one solution (one point of intersection).</i></p>	<p>Case #3 – two identical lines <i>* same slope</i> <i>* same y-intercept</i></p>  <p><i>* an infinite number of solutions</i></p>
	<p>Independent System</p>	<p>Coincident System</p>

Example 3 How many solutions do the following linear systems have?

a. $y = 4x - 3$

b. $y = -5x + 3$

c. $y = x + 1$

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

$y = -5x - 10$

$2x - 2y + 2 = 0$

* different slopes

* same slopes
different b's

$\rightarrow -2y = -2x - 2$

$\frac{-2y}{-2} = \frac{-2x}{-2} - \frac{2}{-2}$

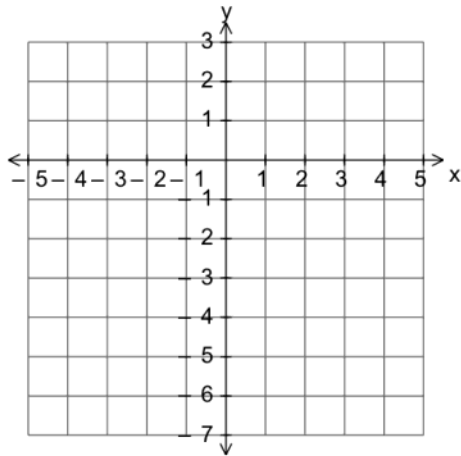
* one solution

* no solution

$y = x + 1$

* an infinite number of solutions.

Example 4 Find the equation of the line that passes through the point of intersection of $y = x - 2$ and $3x - 4y = 12$ and is parallel to $x - 4y + 1 = 0$.



* left as a challenge question
Answer: $y = \frac{1}{4}x - 5$

U6D7 HW: page 348-351 #1, 2, 7, 9, 10, 13, 12(use graphing software for #12)