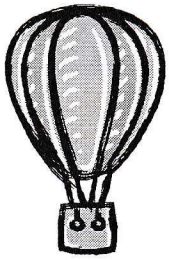
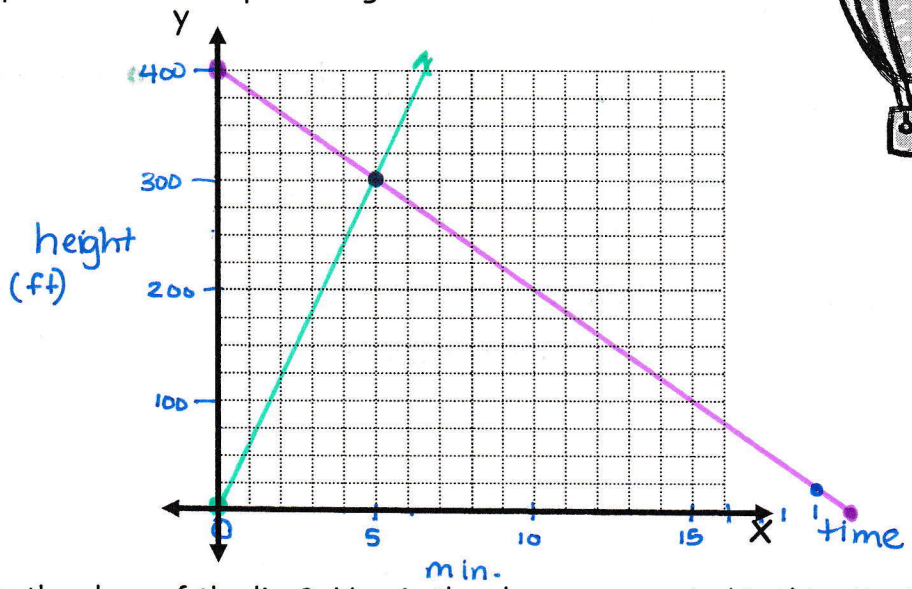
Graphing a Line Given Slope and Y-Intercept

At the West Texas Balloon Festival, a hot air balloon is sighted at an altitude of 400 feet and appears to be descending at a constant rate of 20 feet per minute. Spectators are wondering how the long it will take for the balloon to reach the ground.



1. a. Graph the relationship on the grid.

time	ft
0	400
1	380
2	360
3	340
4	320
5	300



time	ft
0	0
1	60
2	120
3	180
4	240
5	300

b. What is the slope of the line? How is the slope represented in this situation?

$m = \frac{-100}{5} = -20$ } rate that its descending

c. What is the y–intercept? How is the y–intercept represented in this situation?

(0, 400), height that it started at

d. How many minutes will it take the balloon to land?

$\frac{400}{20}$ = 20 minutes

e. How long does it take the balloon to reach an altitude of 20 feet?

19 minutes

2. **At the instant the first balloon was sighted, a second balloon was launched from the ground, rising at a constant rate of 60 feet per minute.**

a. What is the slope of the line? How is the slope represented in this situation?

m = 60, rate that its going up

b. What is the y–intercept? How is the y–intercept represented in this situation?

(0, 0) started from the ground

c. Graph the relationship for the second balloon on the same grid.

d. At what altitude will the second balloon be in 5 minutes?

300 ft.

e. When will the first and second balloons be at the same altitude?

5 min.

Slope: neg # \ pos # /

HOY VUX

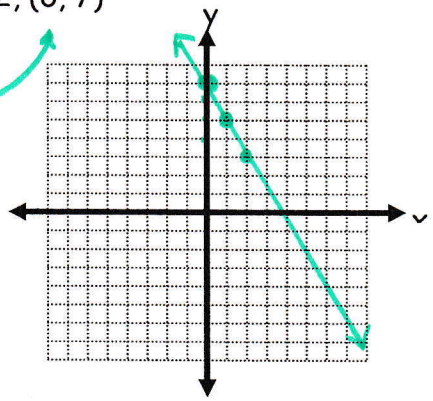
Graph each of the following given the slope and a point.

5. m = –2, (0, 7)

rise / run

start

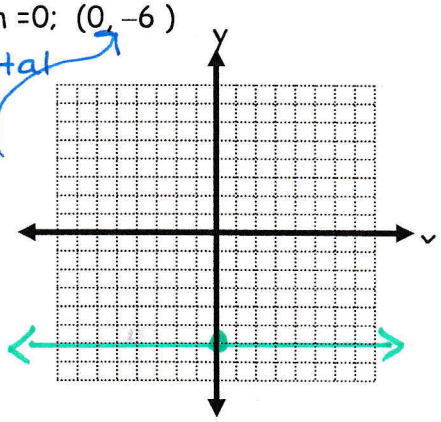
$m = \frac{-2}{1}$ ↓ →



6. m = 0; (0, –6)

horizontal

start



Slope-Intercept Form: y = mx + b, where

m is Slope

b is y-intercept

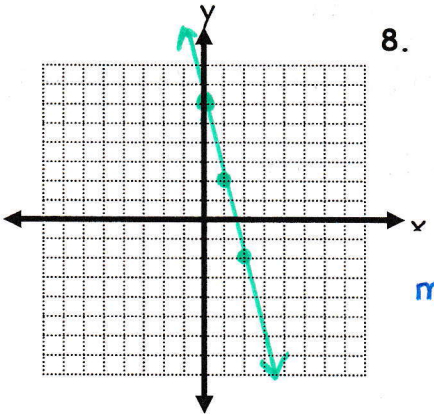
Graph each of the following given the slope and y-intercept.

7. m = – 4; b = 6

start

$m = \frac{-4}{1}$ ↓ →

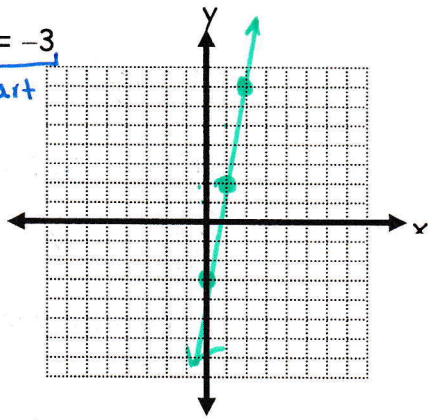
rise / run



8. m = 5; b = –3

start

$m = \frac{5}{1}$ ↑ →



Given the following equations in slope-intercept form, state the values for the slope and y-intercept and graph.

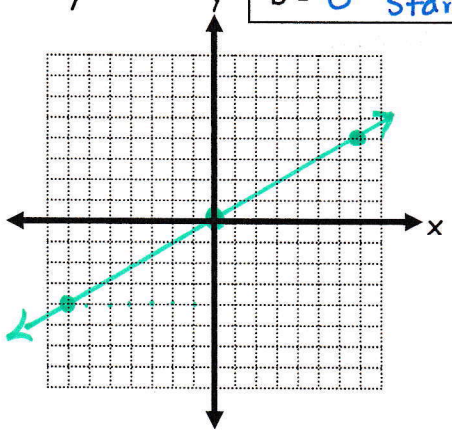
y = mx + b

9. $y = \frac{4}{7}x + 0$

m = 4/7

b = 0 start

$m = \frac{4}{7}$ ↑ →

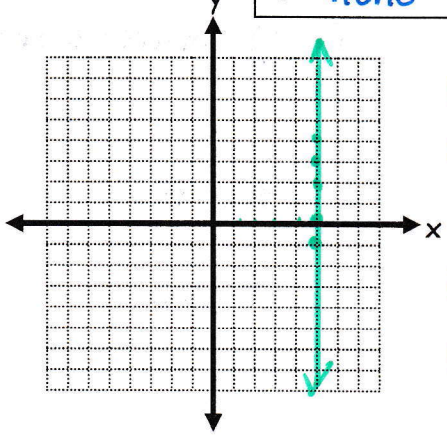


vertical

10. x = 5

m = undefined

b = none



(5, –1)

(5, 0)

(5, 3)

(5, 4)

(5, 6)

slope ↘ ↙ y-intercept

Graph using y=mx + b Form

Unit 3

Find the slope (*m*) and y-intercept (*b*) of the line with the given equation.

Ex 1) $y = 5x - 3$

m b

$m = 5$
$b = -3$

Ex 2) $3x - 3y = 12$

Convert to $y=mx+b$

$-3x$ $-3x$

$\frac{-3y}{-3} = \frac{-3x}{-3} + \frac{12}{-3}$

$y = 1x - 4$

$m = 1$ $b = -4$

Ex 3) $x + 4y = 6$

Convert to $y=mx+b$

$-x$ $-x$

$\frac{4y}{4} = \frac{-x}{4} + \frac{6}{4}$

$y = \frac{-1x}{4} + \frac{3}{2}$

$m = -\frac{1}{4}$ $b = \frac{3}{2}$

Graph each equation using slope-intercept form.

Ex4) $2x + y = 3$

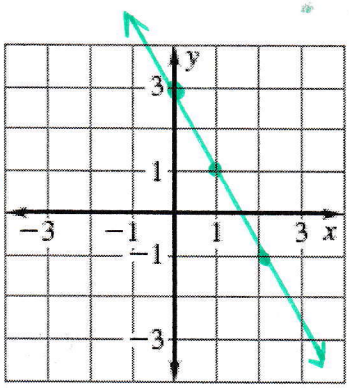
Convert to $y=mx+b$

$-2x$ $-2x$

$y = -2x + 3$

$m = \frac{-2 \downarrow}{1 \rightarrow}$

$b = 3$ (start)



Ex 5) $x + 3y = 9$

Convert to $y=mx+b$

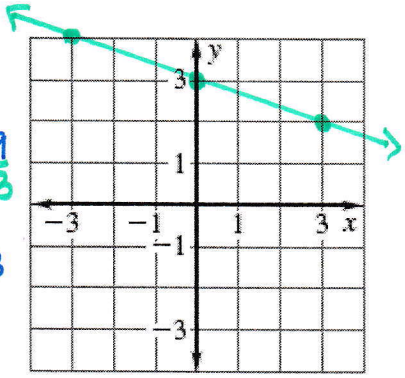
$-x$ $-x$

$\frac{3y}{3} = \frac{-x}{3} + \frac{9}{3}$

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

$m = \frac{-1 \downarrow}{3 \rightarrow}$

$b = 3$ (start)



Ex 6) You can use a laser or inkjet printer to print the 18 page report that Mr. Schwalbach is making you do. The laser printer can print 6 pages/min and the inkjet printer can print 4.5 pages/min. The equations below give the number of pages *p* left to print after *t* minutes. Graph both in the same coordinate plane.

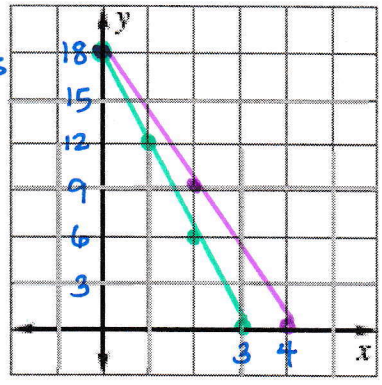
Laser: $p = -6t + 18$ $m = \frac{-6 \downarrow}{1 \rightarrow}$ $b = 18$ start

Inkjet: $p = -4.5t + 18$ $m = -4.5$ $b = 18$

$m = \frac{-9 \downarrow}{2 \rightarrow}$

How many minutes do you SAVE by using the laser printer?

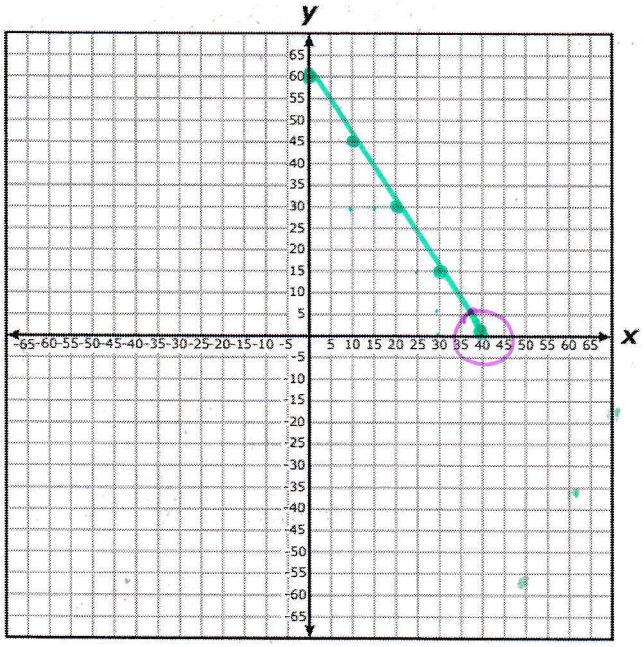
Save 1 minute



Practice STAAR Question

A paper airplane was thrown from the top of a tall building. The height of the paper airplane above the ground can be found using the function $y = -1.5x + 60$, where x is the time in seconds the airplane has been in the air.

height ↑ time →



$m = -1.5 = -\frac{15\downarrow}{10\rightarrow}$

$b = 60$ (start)

How many seconds did it take the paper airplane to reach the ground?

40 seconds, the height is 0.