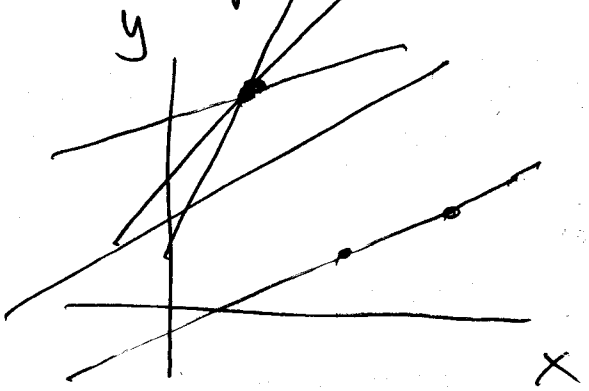
5-20-2013

1.1 Coordinate Systems and Graphs.

① Graphs of linear equations.

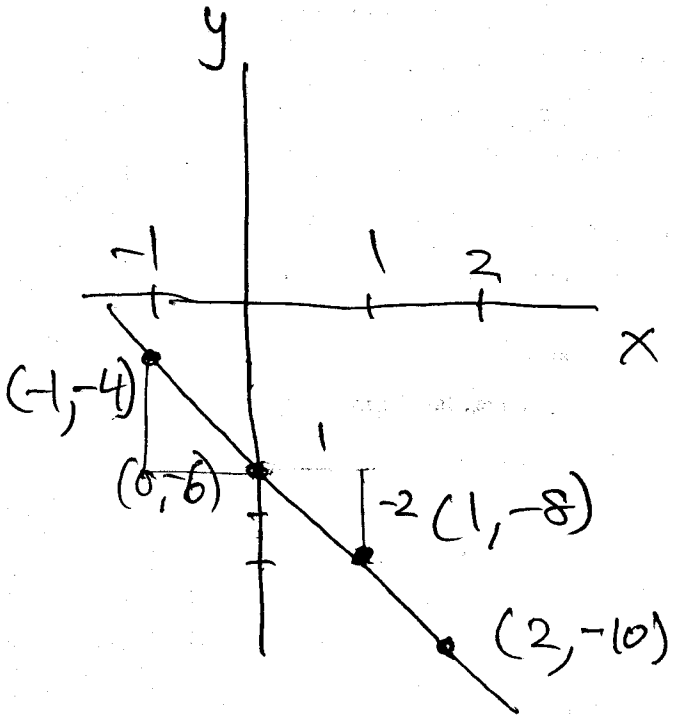


What determines a line?

a. two points.

b. one point plus the "slant", "direction", "steepness". This is given by slope.

e.g. #16 $y = \boxed{-2}x - 6$ $\quad m = -2$, $b = -6$



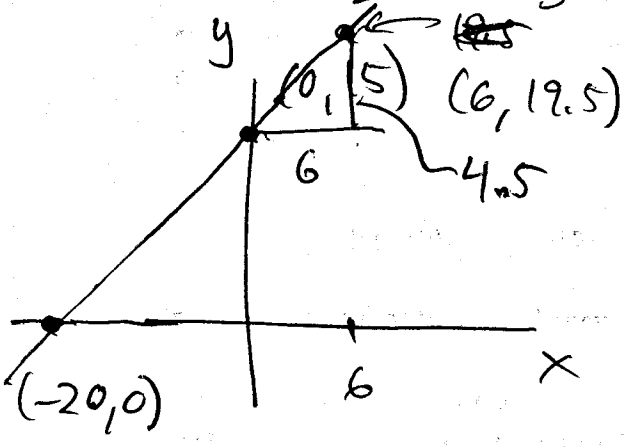
a. two points.

$x = 1 \rightarrow y = -2 - 6 = -8$

$x = 0 \rightarrow y = -6$

$(0,-6)$, $(1,-8)$

#22) $-\frac{1}{2}x + \frac{2}{3}y = 10$



$x = 0 \quad \frac{2}{3}y = 10$

$y = 10 \cdot \frac{3}{2} = 15$

$(0, 15)$

$y = 0 \quad -\frac{1}{2}x = 10$

$x = -20$

$(-20, 0)$

$x = 6 \quad -\frac{1}{2}(6) + \frac{2}{3}y = 10$

$-3 + \frac{2}{3}y = 10$

$\frac{2}{3}y = 13$

$y = \frac{39}{2} = 19.5$

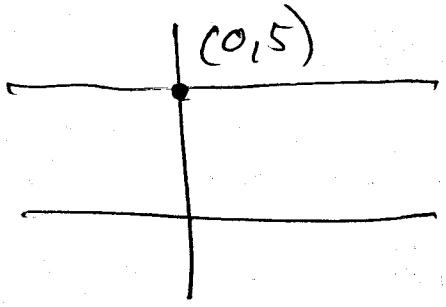
Standard form:

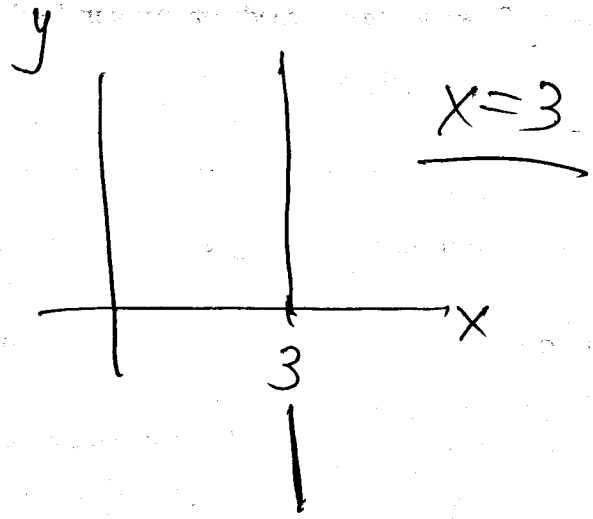
$-\frac{1}{2}x + \frac{2}{3}y = 10$

$\frac{3}{2}\left(\frac{2}{3}y\right) = \left(\frac{1}{2}x + 10\right)\left(\frac{3}{2}\right)$

$y = \frac{3}{4}x + 15$

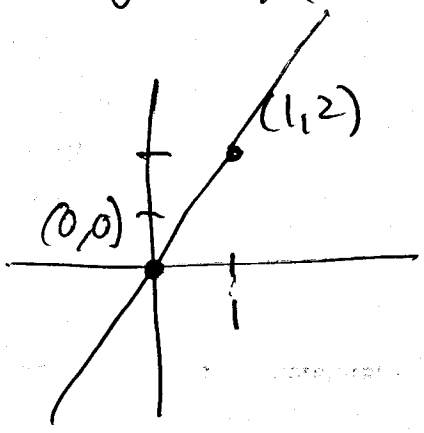
#24) $y = 5$





$x = 3$

eg $y = 2x$



#36) $\frac{1}{2}x - 5y = 1 \longrightarrow -5y = -\frac{1}{2}x + 1$

$y = \frac{1}{10}x - \frac{1}{5}$

$y = 0 \quad \frac{1}{2}x = 1$

$x = 2$

(2,0)

(d), (e) (f).

~~$y = 2$~~

$\frac{1}{2}x - 10 = 1$

$\frac{1}{2}x = 11$

$x = 22 \quad (22, 2)$

(2) Linear Models.

#40) p 8 $y = -\frac{25}{8}x + 130$

y = 1000s of sq. miles of rainforest

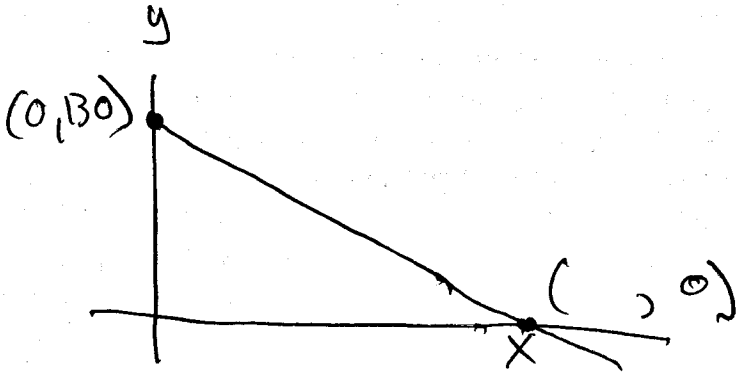
x = years after 1969.

y-intercept? (0, 130)

In 1969 there were 130,000 sq. miles of rainforest.

slope? $m = -\frac{25}{8} = -3.125$

Each year, we lose 3152 sq miles of rainforest.



When do we lose all rainforest? in 2010

$0 = -\frac{25}{8}x + 130$

$\frac{25}{8}x = 130$

$x = \frac{130 \cdot 8}{25} = 41.6$ years

1969 + 41.6 = 2010.6

41) $y = .075x + 2.5$

y = trillions of cigarettes purchased.

x = years after 1960.

Interpret y-intercept?

In 1960, 2.5 trillion cigarettes were purchased.

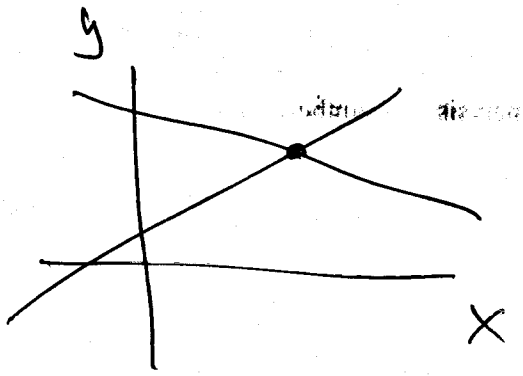
Interpret slope?

Each year after 1960, number of cigarettes purchased increases by .075 trillion.

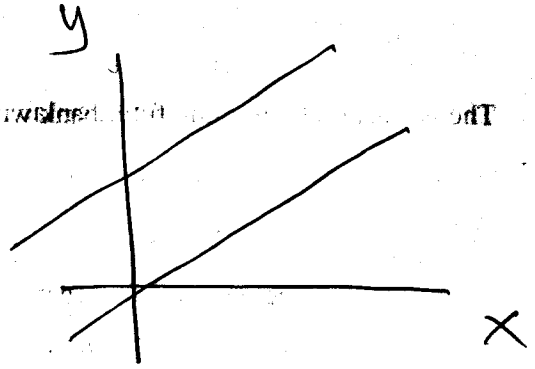
75 billion.

So rate of increase in cigarette buying is 75 billion per year.

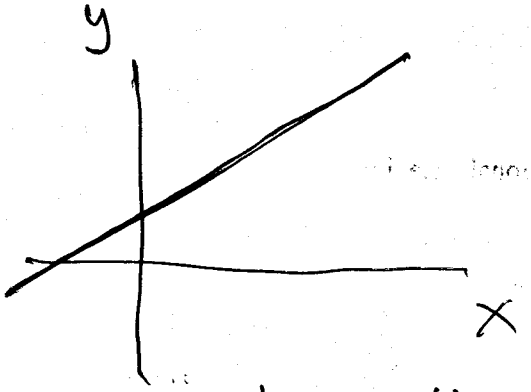
1.3 Intersection point of a pair of lines



one point of intersection



no point of intersection



all points on line are intersection pts. (lines are identical)

#2) $y = 3x - 15$
$y = -2x + 10$

$\rightarrow 3x - 15 = -2x + 10$

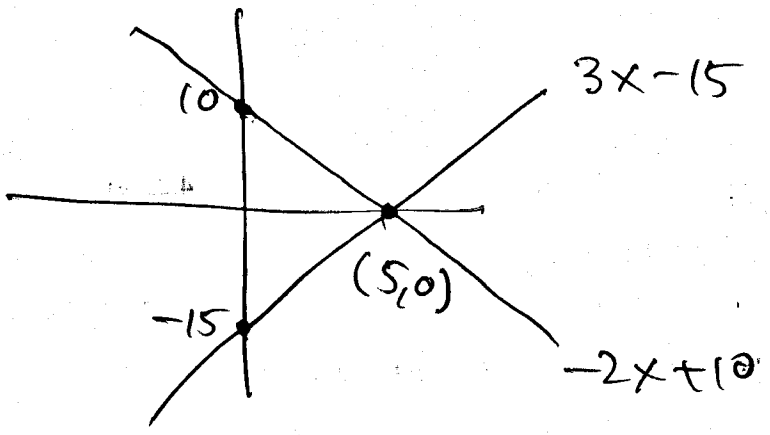
$5x = 25$

$x = 5$

$y = 3(5) - 15 = 0$

or $y = -2(5) + 10 = 0$

pt of int is $(5, 0)$



#8) $y = \frac{1}{3}x - 1$ Does (12,4) satisfy the system? NO

$x = 12$

$4 \stackrel{?}{=} \frac{1}{3}(12) - 1$ → YES

$4 \stackrel{?}{=} 3$ NO

Solution: $x = 12$

$y = \frac{1}{3}(12) - 1 = 3$

(12,3).