5-21-2013

Intersection point of 2 lines.

eg. $x+2y=4$ Want: A pair (x,y) satisfies both equations

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

$\rightarrow 2\left(\frac{1}{2}x+\frac{1}{2}y=3\right)$ | $-x+2y=4$

$x+y=6$ | $x+y=6$

① Multiply one equation by a constant (both sides) we don't change the solution.

$x+2y=4 \longrightarrow x=4-2y$

$x+y=6 \longrightarrow x=6-y \rightarrow 4-2y=6-y$

$\rightarrow \boxed{-2=y}$ $x=6-(-2)=8$

$(8,-2)$.

$x+2y=4$

$-(x+y=6)$ $\longrightarrow x-2=6 \rightarrow \underline{x=8}$

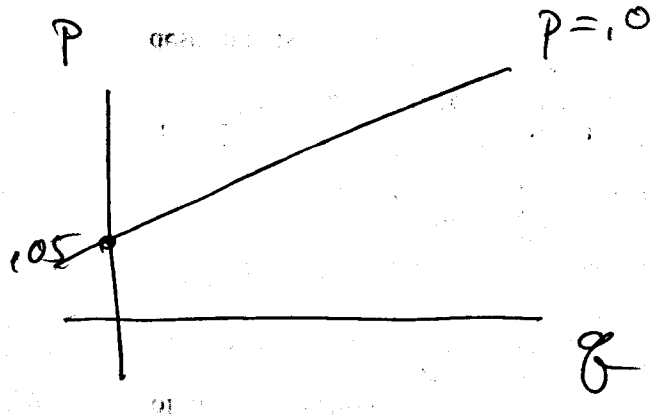
$0+y=-2 \Rightarrow \underline{y=-2}$

② Adding a multiple of one equation to another does not change the solution.

#23) Supply curve $p = .0001q + .05$

p = price of a commodity

q = amount supplied.

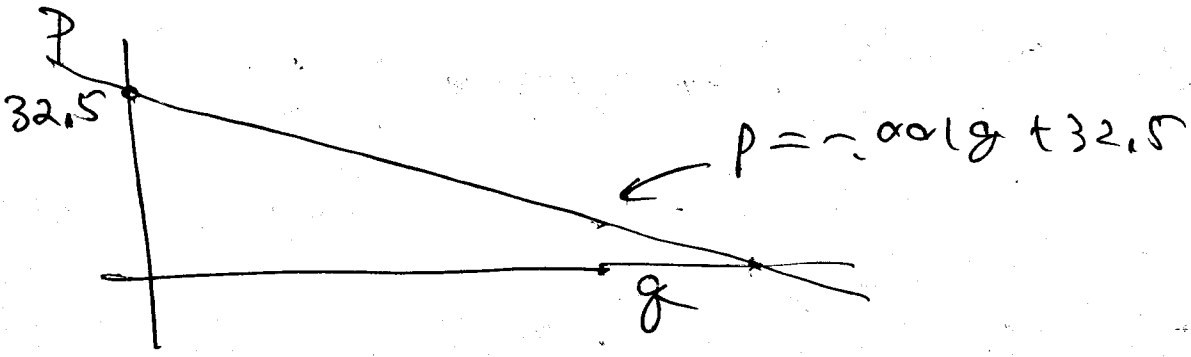


(a) $q = 19500$ $\quad p = (.0001)(19500) + .05$

$= 1.95 + .05 = 2.00$

(b) $q = 0$ $\quad p = (.0001)(0) + .05 = .05$

#24) Demand curve $p = -.001q + 32.5$



(a) $q = 31,500$ $\quad p = (-.001)(31,500) + 32.5$

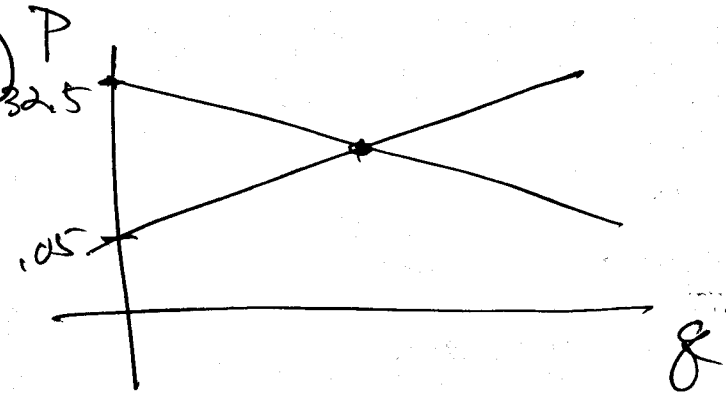
$= -31.5 + 32.5 = 1.00$

(b) $0 = -.001q + 32.5$

$.001q = 32.5$

$q = 32,500$

#25)



$P = .0001q + .05$ $\quad P - .0001q = .05$

$P = -.001q + 32.5$ $\quad -(P + .001q = 32.5)$

$0 - .0011q = -32.45$

$q = \frac{32.45}{.0011} = \underline{29,500.}$

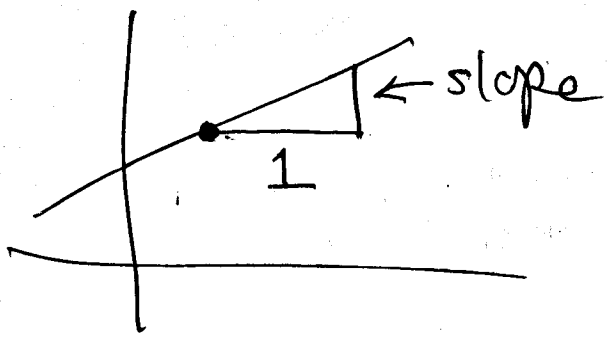
$P = (.0001)(29500) + .05$

$= 2.95 + .05 = \underline{3.00}$

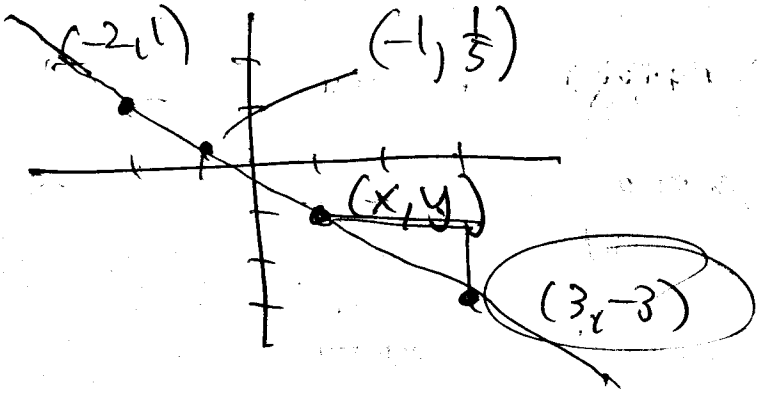
1.4 Slope of a Straight Line.

Slope of a line measures "steepness" or "slant"

How?



#6) $(-2,1)$ $(3,-3)$ Find slope of line passing through these points.



$$m = \frac{\Delta y}{\Delta x} = \frac{1-(-3)}{-2-3}$$

$$= \frac{4}{-5} = -\frac{4}{5}$$

Equation of line. (point-slope formula)

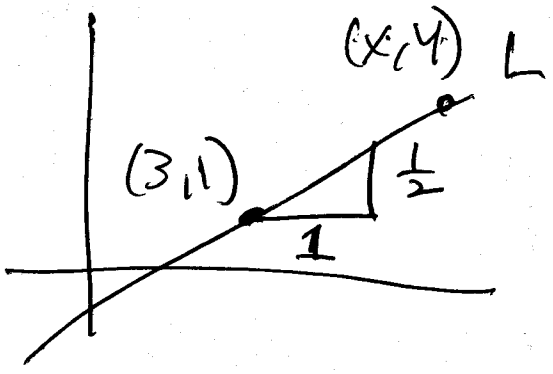
$$\frac{y-(-3)}{x-3} = -\frac{4}{5} \rightarrow \frac{y+3}{x-3} = \frac{-4}{5}$$

$$5(y+3) = -4(x-3)$$

$$5y+15 = -4x+12$$

$$5y+4x = -3$$

#16)



Find eqn of line

$m = \frac{1}{2}$

$$\frac{y-1}{x-3} = \frac{1}{2} \rightarrow 2(y-1) = x-3$$

$$2y-2 = x-3$$

$$2y - x = -1$$

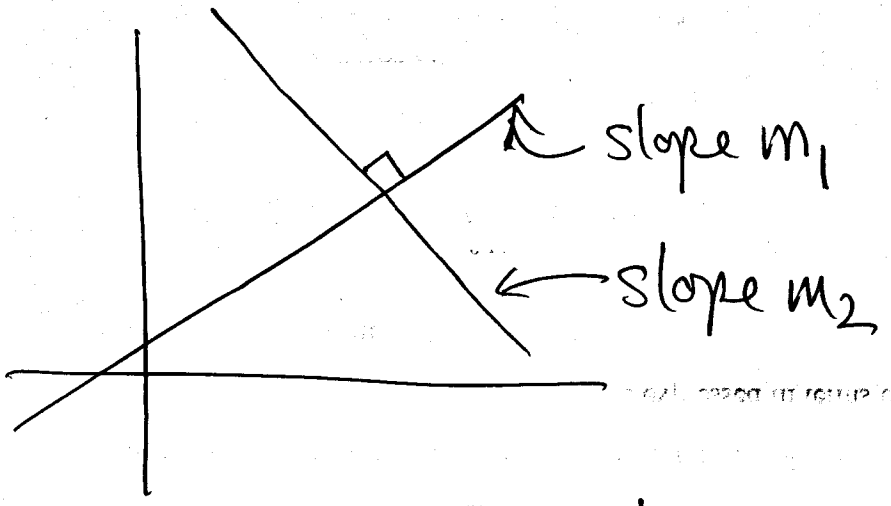
#32) $y = 40x + 2400$

y = cost in $

x = # coats produced

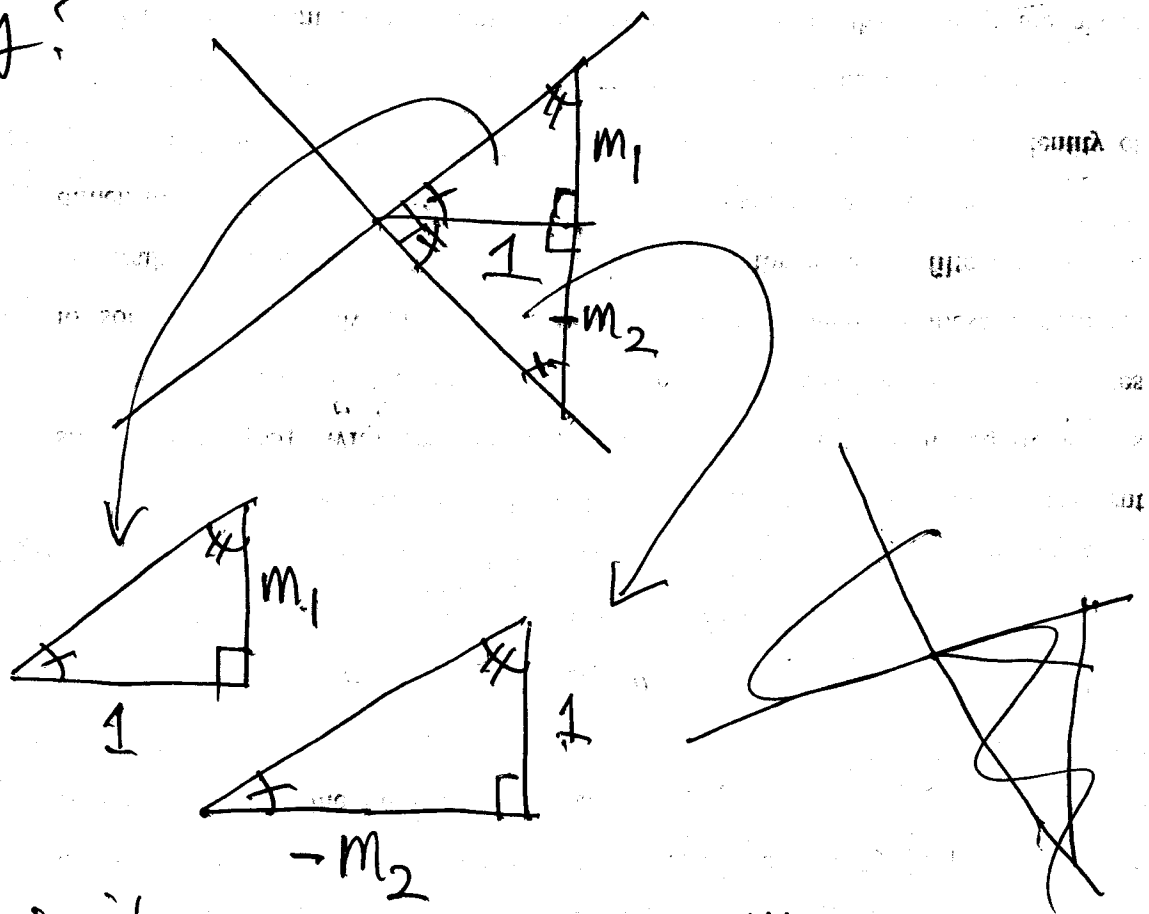
slope = 40 $/coat Every additional coat costs $40 to make.

Perpendicular lines.



$$m_2 = -\frac{1}{m_1} \quad \underline{\text{OR}} \quad m_1 m_2 = -1$$

Why?



similar triangles. So $\frac{m_1}{1} = \frac{1}{-m_2}$ $\boxed{m_1 = -\frac{1}{m_2}}$

2.1 Solving systems, I.

① What is a linear system?

a. Intersection of 2 lines

$$3x-2y=1$$
$$2x+y=10$$

2 equations
2 unknowns.

Seen how to solve.

$$3x-2y=1 \longrightarrow 3x-2y=1$$
$$2(2x+y=10) \qquad 4x+2y=20$$
$$7x \quad =21$$

$$\boxed{x=3}$$

$$3(3)-2y=1$$
$$9-2y=1$$
$$8=2y \longrightarrow \boxed{y=4}$$

b. EG 1 p52

x = # jackets
y = # vests
z = # comforters.

$$3x+2y+4z=600$$
$$2x+y+z=275$$
$$6x+6y+2z=1150$$

3 equations
3 unknowns.

② Gauss-Jordan method (or Gaussian elimination)

Row operations

① Interchange 2 equations

② Multiply one equation by constant

③ Add two equations together

None of these change the solutions of the system ⊛