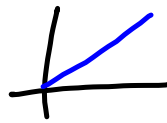


3.5 VARIATION

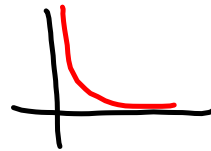
DIRECT VAR.

$$y = kx$$



INVERSE
~~INDIRECT~~ VAR.

$$y = \frac{k}{x}$$



JOINT VAR.

$$y = kxz$$



k is the
constant
of variation.

$k \neq 0$
 $k \in \mathbb{R}$

Ex. 1

(a) a VARIES DIRECTLY AS t

USE $y = kx$ $a = kt$

(b) c IS INVERSELY PROPORTIONAL TO m

USE $y = \frac{k}{x}$ $c = \frac{k}{m}$

(c) q VARIES JOINTLY AS x & y

USE $y = kxz$ $q = kxy$

Ex. 2 FINDING K

(a) a VARIES DIRECTLY AS x

$a = 10$ WHEN $x = 2$

$$a = kx$$
$$10 = 2k$$
$$k = 5$$

$a = 5x$

(b) w IS INVERSELY PROPORTIONAL TO t

$w = 10$ WHEN $t = 5$

$$w = \frac{k}{t}$$

$$10 = \frac{k}{5}$$

$$k = 50$$

$w = \frac{50}{t}$

(c) m VARIES JOINTLY AS a & b

$m = 24$ WHEN $a = 2$ & $b = 3$

$$y = kxz \rightarrow m = kab \rightarrow 24 = k(2)(3)$$

$$k = 4$$

$m = 4ab$

Ex. 3 APPLICATION

A: AMOUNT PAID
E: ELECTRICITY USED

$$A = KE$$

$$A = 196 \text{ WHEN } E = 2800$$

$$\frac{196}{2800} = \frac{k(2800)}{2800}$$

$$k = \$0.07/\text{KW}$$

$$A = 0.07E$$

$$A = 0.07(4000)$$

$$\boxed{A = \$280}$$

Ex. 4

V: VOLUME

P: PRESSURE

$$V = \frac{k}{P}$$

$$V = \frac{2400}{P}$$

$$V = 12 \quad P = 200$$

$$V = \frac{2400}{150}$$

$$200(12) = \left(\frac{k}{200}\right) 200$$

$$k = 2400$$

$$V = 16 \text{ cc}$$

3.6 GRAPHING LINEAR INEQUALITIES IN 2 VARS.

LINEAR INEQUALITY

$$Ax + By \text{ } \textcircled{<} \text{ } C$$

COULD BE
 $< > \leq \geq$

$A, B, C \in \mathbb{R}; A \text{ \& } B \text{ NOT BOTH } 0$

Ex. 1 SATISFYING A LINEAR INEQUALITY

$$2x - 3y \geq 6$$

(a) $(4, 1)$ $2(4) - 3(1) \geq 6?$
 $8 - 3 \geq 6?$
 $5 \neq 6$ NO

(b) $(3, 0)$ $2(3) - 3(0) \geq 6?$
 $6 - 0 \geq 6$
 $6 = 6$ YES.

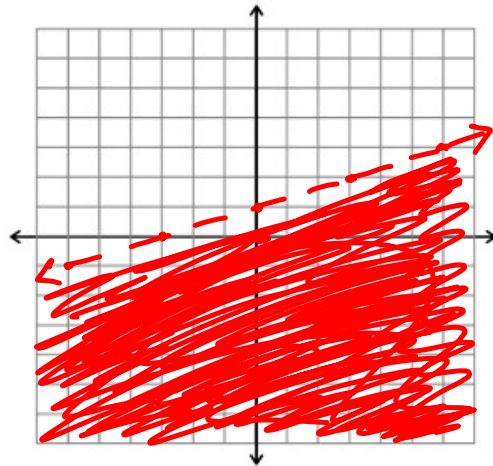
(c) $(3, -2)$ $2(3) - 3(-2) \geq 6?$
 $6 + 6 \geq 6?$
 $12 \geq 6$ YES.

Ex. 2

a) $y < \frac{1}{3}x + 1$

< > - - - -

≤ ≥ —————

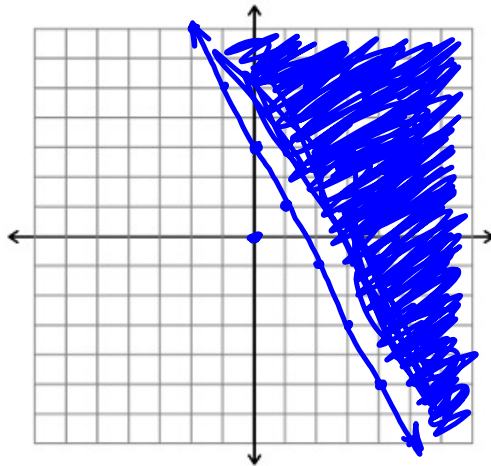


b) $y \geq -2x + 3$

$0 \geq -2(0) + 3$

$0 \geq 3$ NO

SHADE THE OTHER SIDE



c) $2x - 3y > 6$

$\frac{-2x}{-3}$

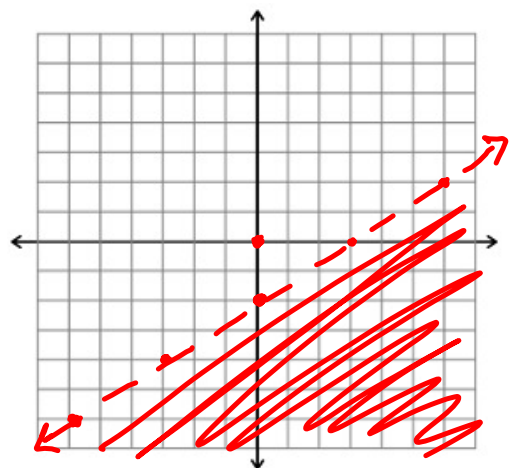
$\frac{-2x}{-3}$

$y > \frac{-2x + 6}{-3}$

$y < \frac{2}{3}x - 2$

$(0, 0) \quad 0 < \frac{2}{3}(0) - 2?$

$0 < -2? \text{ NO}$



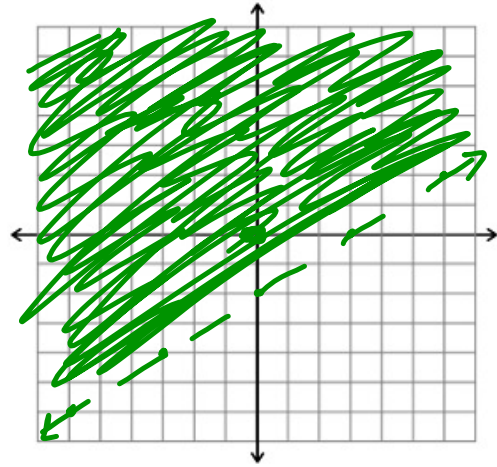
Ex 4

Ⓐ $2x - 3y < 6$

$$y > \frac{2}{3}x - 2$$

$(0, 0)$ $0 > \frac{2}{3}(0) - 2$

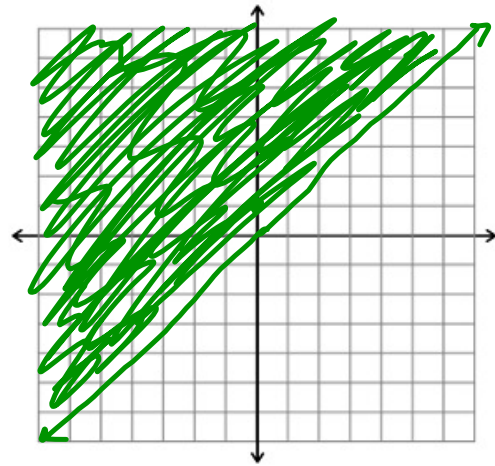
$$0 > -2 \text{ YES}$$



Ⓑ $x - y \leq 0$

$$y \geq x$$

$(0, 1)$ $1 \geq 0 ? \text{ YES}$



Ex. 5

AT MOST 8000

ROUND 50 x $50x$

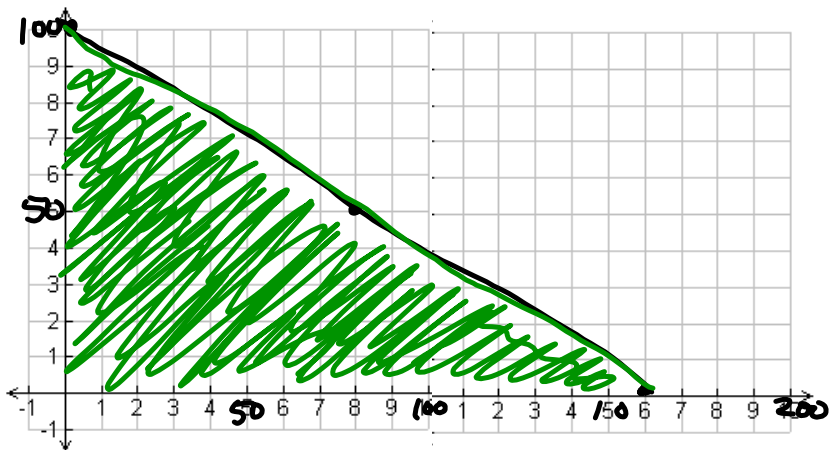
RECT 80 y $80y$

$$50x + 80y \leq 8000$$

$$\begin{array}{r} 50x + 80y \leq 8000 \\ -50x \\ \hline 80y \leq -50x + 8000 \end{array}$$

$$\frac{80y}{80} \leq \frac{-50x + 8000}{80}$$

$$y \leq -\frac{5}{8}x + 100$$



Ex. 5 (p. 227) JOINT VARIATION APPLICATION

C - COST

$$C = kwd$$

$$y = kxz$$

W - WEIGHT

d - DISTANCE

$$C = 3000 \text{ WHEN } w = 2500, d = 600$$

$$\frac{3000}{1500000} = \frac{k(2500)(600)}{1500000}$$

$$C = .002wd$$

$$.002 = k$$

$$C = .002(1500)(800)$$

$$C = \$2400$$