

# Exam 1

Note Title

5/28/2016

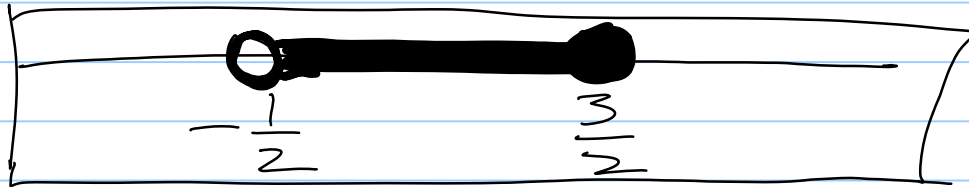
$$1) \quad 6 \left( -\frac{1}{2} < \frac{4x-1}{6} \leq \frac{5}{6} \right)$$

$$-3 < 4x-1 \leq 5$$

$$\underline{+1} \qquad \underline{+1} \qquad \underline{+1}$$

$$\underline{-2} < \underline{4x} \leq \underline{6}$$

$$\boxed{-\frac{1}{2} < x \leq \frac{3}{2}}$$



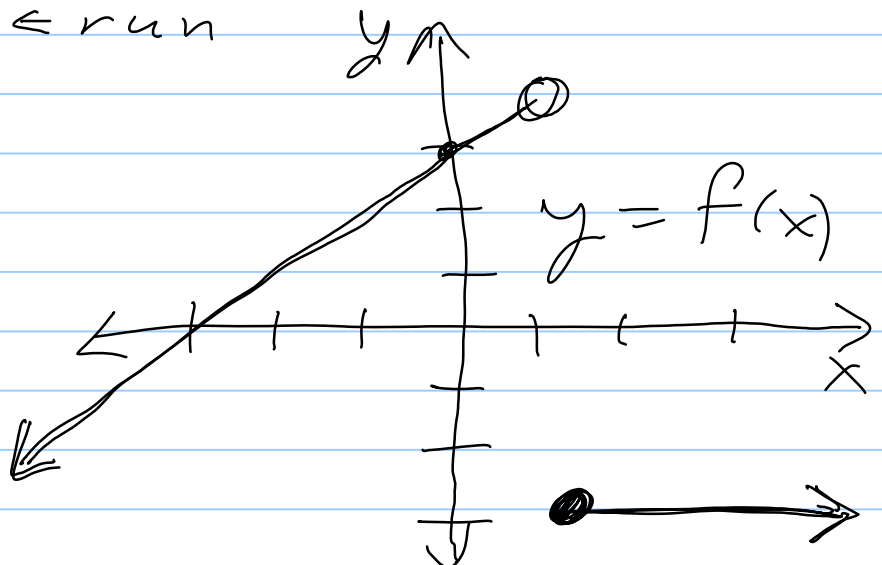
$$\boxed{\left(-\frac{1}{2}, \frac{3}{2}\right]}$$

$$2) \quad f(x) = \begin{cases} x+3 & \text{if } x < 1 \\ -3 & \text{if } x \geq 1 \end{cases}$$

$$y = x + 3$$

$$m = \frac{1 \leftarrow \text{rise}}{1 \leftarrow \text{run}}$$

$$b = 3$$



$$3) \quad 15 \left( \frac{m-4}{3} - \frac{3m-1}{5} = 1 \right)$$

$$5(m-4) - 3(3m-1) = 15$$

$$5m - 20 - 9m + 3 = 15$$

$$-4m - 17 = 15$$

$$\quad \quad \quad \underline{+17} \quad \quad \underline{+17}$$

$$\underline{-4m} = \underline{32}$$

$$\quad \quad \quad \underline{-4} \quad \quad \quad \underline{-4}$$

$$\boxed{m = -8}$$

$$4) \quad |3+6n| = |4n+11|$$

$$3+6n = 4n+11$$

$$\underline{-3-4n} \quad \underline{-4n-3}$$

$$\underline{2n} = \underline{8}$$

$$\boxed{n = 4}$$

$$\vee \quad 3+6n = -(4n+11)$$

$$3+6n = -4n-11$$

$$\underline{-3+4n} \quad \underline{+4n-3}$$

$$\underline{10n} = \underline{-14 \div 2}$$

$$\quad \quad \quad \underline{10} \quad \quad \quad \underline{10 \div 2}$$

$$\boxed{n = -\frac{7}{5}}$$

$$5) \quad |6x-8| + 3 \geq 17$$

$$\quad \quad \quad \underline{-3} \quad \quad \underline{-3}$$

$$|6x-8| \geq 4$$

$$\Rightarrow 6x-8 \geq 4 \quad \vee \quad 6x-8 \leq -4$$

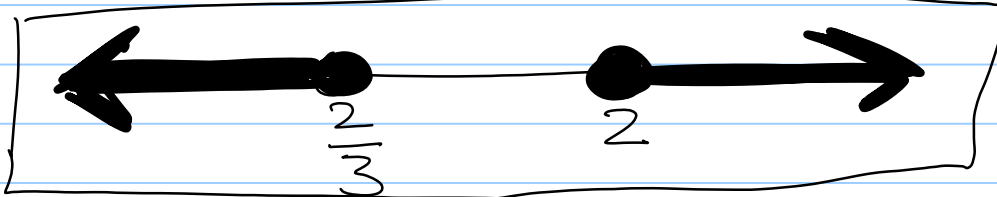
$$\quad \quad \quad \underline{+8} \quad \underline{+8}$$

$$\quad \quad \quad \underline{+8} \quad \quad \underline{+8}$$

$$\frac{6x}{6} \geq \frac{12}{6}$$

$$\frac{6x}{6} \leq \frac{4}{6} \div 2$$

$$x \geq 2 \quad \vee \quad x \leq \frac{2}{3}$$



$$(-\infty, \frac{2}{3}] \cup [2, \infty)$$

6)  $y = |x + 13|$

Determine Critical Number

$$x + 13 = 0$$

$$\underline{-13} \quad \underline{-13}$$

$$x = -13$$

$$y = |-15 + 13| = |-2| = 2$$

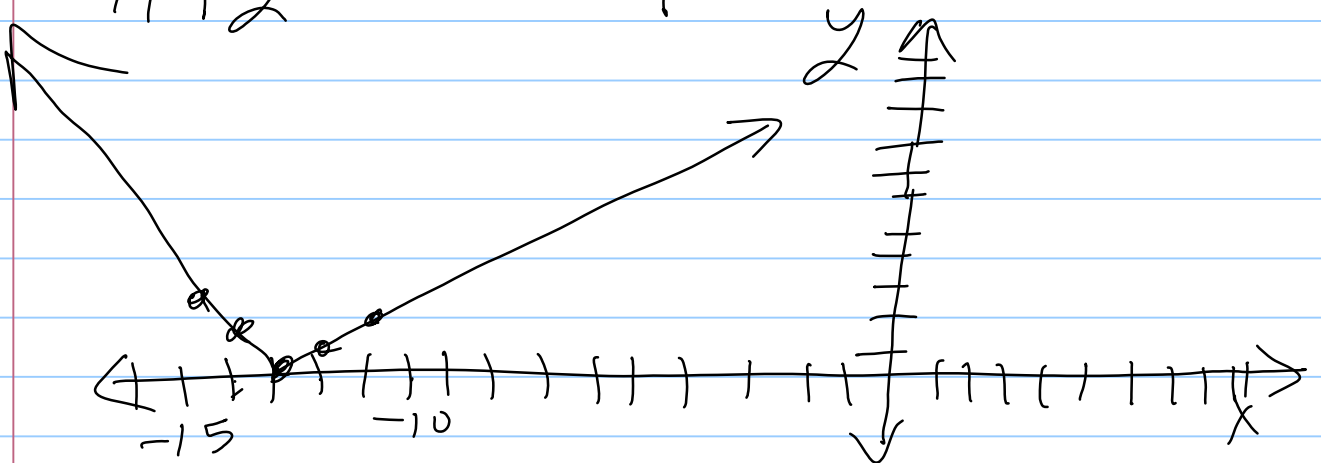
$$y = |-14 + 13| = |-1| = 1$$

$$y = |-13 + 13| = |0| = 0$$

$$y = |-12 + 13| = |1| = 1$$

$$y = |-11 + 13| = |2| = 2$$

x	y
-15	2
-14	1
-13	0
-12	1
-11	2



$$7) (-3, -8), (-6, -9)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-8 + 9}{-3 + 6} = \frac{1}{3}$$

$$y - y_1 = m(x - x_1)$$

$$y + 8 = \frac{1}{3}(x + 3)$$

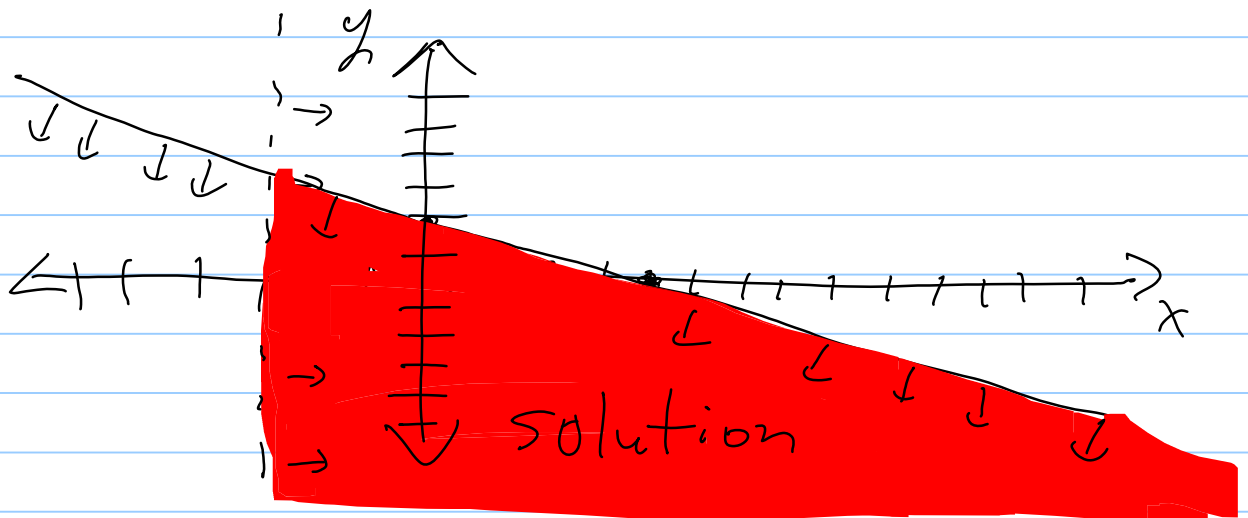
$$y + 8 = \frac{1}{3}x + 1$$

$$y = \frac{1}{3}x - 7$$

$$f(x) = \frac{1}{3}x - 7$$

$$8) y \leq -\frac{2}{5}x + 2 \quad \wedge \quad x > -3$$

*true below*      *true right*  
*solid line*      *dashed line*



$$m = \frac{-2 \text{ rise}}{5 \text{ run}}$$

$$b = 2$$

$$9) \frac{x+5}{2} = \frac{6-4y}{3}$$

$$10) \left( \frac{3x}{5} = \frac{21-7y}{10} \right)$$

$$3(x+5) = 2(6-4y)$$

$$3x+15 = 12-8y$$

$$\underline{+8y-15} \quad \underline{-15+8y}$$

$$R: 3x+8y = -3$$

$$R \Rightarrow 3x+8(-3) = -3$$

$$3x-24 = -3$$

$$\underline{+24} \quad \underline{+24}$$

$$6x = 21-7y$$

$$\underline{+7y} \quad \underline{+7y}$$

$$S: 6x+7y = 21$$

$$-2R: -6x-16y = 6$$

$$\underline{-9y = 27}$$

$$\underline{-9} \quad \underline{-9}$$

$$y = -3$$

$$\frac{3x}{3} = \frac{21}{3} \Rightarrow x = 7$$

$$I(7, -3)$$

$$10) \left( \frac{2x^5}{y^6} \right)^3 \left( \frac{3x^7}{y^2} \right)^{-2}$$

$$= \frac{8x^{15}}{y^{18}} \cdot \frac{y^4}{9x^{14}} = \frac{8x}{9y^{14}}$$

$$11) (-2, -5)$$

$$\perp 4x - y = 17$$

$$m = 4$$

$$m_{\perp} = -\frac{1}{4}$$

$$\underline{-4x} \quad \underline{-4x}$$

$$\underline{-y} = \underline{-4x} + \underline{17}$$

$$\underline{-(-)} \quad \underline{-(-)} \quad \underline{-(-)}$$

$$y - y_1 = m(x - x_1) \quad y = 4x - 17$$

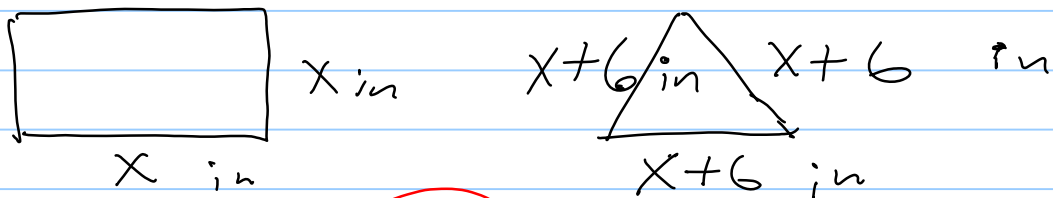
$$y + 5 = -\frac{1}{4}(x + 2)$$

$$4(y + 5 = -\frac{1}{4}x - \frac{1}{2})$$

$$\begin{array}{r} 4y + 20 = -x - 2 \\ +x \quad -20 \quad +x \quad -20 \\ \hline \end{array}$$

$$\boxed{x + 4y = -22}$$

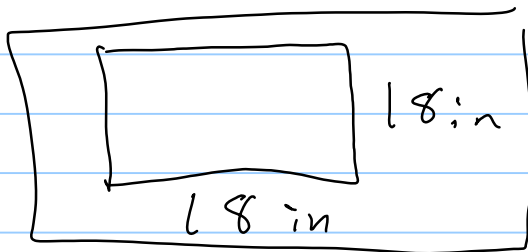
12)



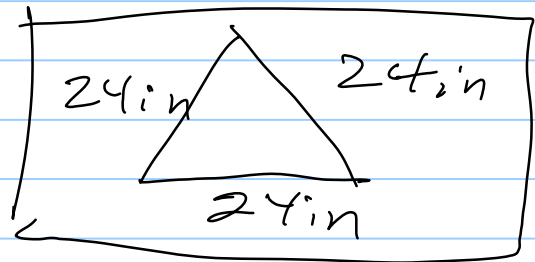
$$4x = 3(x + 6)$$

$$\begin{array}{r} 4x = 3x + 18 \\ -3x \quad -3x \\ \hline \end{array}$$

$$x = 18$$



$$x + 6 = 24$$



13)

let  $x$  = middle integer

$x - 2$  = preceding even integer

$x + 2$  = succeeding even integer

$$\Rightarrow x - 2 + x + 2 = 540$$

$$\begin{array}{r} 2x = 540 \\ \underline{2} \quad \underline{2} \end{array}$$

$$x = 270$$

$$\boxed{268, 270, 272}$$

14)

$$\begin{array}{ccc} \boxed{4\%} & + & \boxed{1\%} = \boxed{3\%} \\ x \text{ gts} & & (2400-x) \text{ gts} \quad 2400 \text{ gts} \end{array}$$

$$.04x + .01(2400-x) = .03(2400)$$

$$.04x + 24 - .01x = 72$$

$$.03x + 24 = 72$$

$$\underline{-.24} \quad \underline{-.24}$$

$$\begin{array}{r} .03x = 48 \\ \underline{.03} \quad \underline{.03} \end{array}$$

$$x = 1600$$

$$\boxed{\begin{array}{l} 1600 \text{ gts of } 4\% \\ 800 \text{ gts of } 1\% \end{array}}$$

15) a mph  $\leftarrow$   $\leftarrow$   $\leftarrow$  w mph

$$\leftarrow 2520 \text{ miles} \leftarrow$$

$$\leftarrow 4.5 \text{ hrs} \leftarrow$$

$$\rightarrow 2160 \text{ miles} \rightarrow$$

$$\rightarrow 4.5 \text{ hrs} \rightarrow$$

$$d = r t$$

$$R : 2520 = (a + w) 4.5$$

$$S : 2160 = (a - w) 4.5$$

$$4680 = (2a) 4.5$$

$$\frac{4680}{9} = \frac{9a}{9}$$

$$a = 520$$

$$R \Rightarrow (520 + w) 4.5 = 2520$$

$$\begin{array}{r} 2340 + 4.5w = 2520 \\ \underline{-2340} \qquad \qquad \underline{-2340} \end{array}$$

$$\frac{4.5w}{4.5} = \frac{180}{4.5}$$

$$w = 40$$

plane	520 mph
wind	40 mph