

KEY

①

Find an equation of the line described

a. through $(-1, 6)$ and parallel to $3x + 4y = 12$

$$\begin{aligned} 3x + 4y &= 12 \\ 4y &= -3x + 12 \\ y &= -\frac{3}{4}x + 3 \\ m &= -\frac{3}{4} \end{aligned}$$

$$\begin{aligned} y &= mx + b \quad \text{or} \quad y - y_1 = m(x - x_1) \\ 6 &= -\frac{3}{4}(-1) + b \\ 6 &= \frac{3}{4} + b \\ 5\frac{1}{4} &= b \end{aligned}$$

$$y = -\frac{3}{4}x + 5\frac{1}{4}$$

b. through $(-1, 6)$ and perpendicular to $3x + 4y = 12$

$$\begin{aligned} 3x + 4y &= 12 \\ m &= -\frac{3}{4} \\ m_{\perp} &= \frac{4}{3} \end{aligned}$$

$$\begin{aligned} y &= mx + b \\ 6 &= \frac{4}{3}(-1) + b \\ 6 &= -\frac{4}{3} + b \\ 7\frac{1}{3} &= b \end{aligned}$$

$$y = \frac{4}{3}x + 7\frac{1}{3}$$

c. through $(3, -2)$ and $(4, 1)$

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

$$\begin{aligned} (4, 1) \\ 1 &= 3(4) + b \\ -11 &= b \end{aligned}$$

$$y = 3x - 11$$

d. with x-intercept 5 and y-intercept -3

$$(5, 0) \quad (0, -3)$$

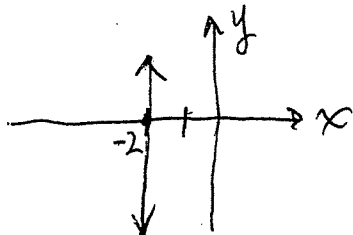
$$m = \frac{-3 - 0}{0 - 5} = \frac{3}{5}$$

$$y = \frac{3}{5}x - 3$$

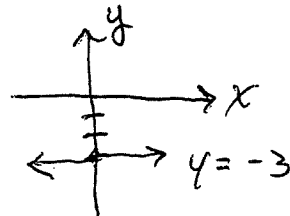
②

Graph

a. $x = -2$



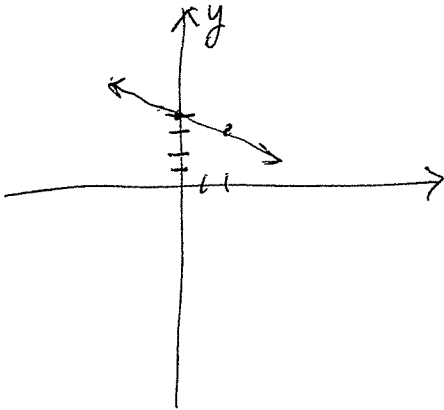
b. $y = -3$



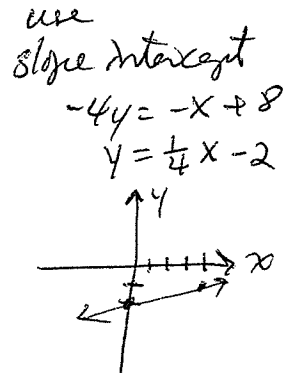
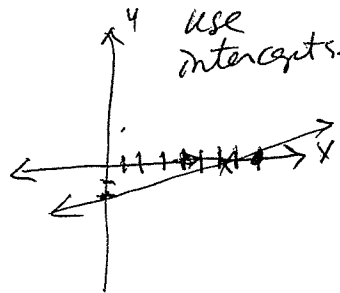
3

Draw an axis and graph the following lines.

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



b. $x - 4y = 8$



4

Find the x and y-intercepts of the line $2x - 3y = 12$.

<u>x-int</u>	<u>y-int</u>
$2x = 12$	$-3y = 12$
$x = 6$	$y = -4$
$(6, 0)$	$(0, -4)$

5

Write $2x - 3y = 12$ in slope intercept form. What is the slope? y-intercept?

$$-3y = -2x + 12$$

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

$$\text{slope} = \frac{2}{3}$$

$$y\text{-int} = -4$$

6

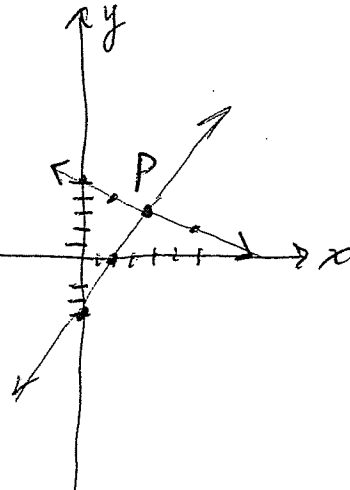
Solve the system algebraically, then sketch a graph of the lines and label the point of intersection P.

$$\begin{array}{r} x + 2y = 10 \\ 3x - 2y = 6 \\ \hline 4x = 16 \\ x = 4 \end{array}$$

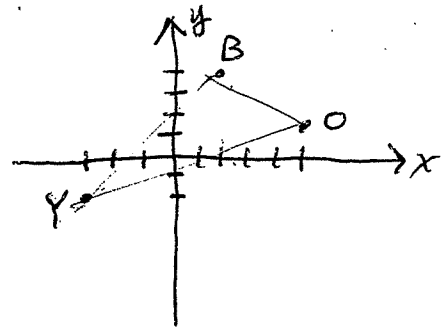
$$\begin{array}{r} 4 + 2y = 10 \\ 2y = 6 \\ y = 3 \end{array}$$

Solution
 $(4, 3)$

$$\begin{array}{r} x + 2y = 10 \\ 2y = -x + 10 \\ y = -\frac{1}{2}x + 5 \\ \hline 3x - 2y = 6 \\ -2y = -3x + 6 \\ y = \frac{3}{2}x - 3 \end{array}$$



7) For each question below use the $\triangle BOY$ where $B(2,4)$, $O(5,1)$ and $Y(-3,-2)$



Find the equation of the altitude \overline{BG} .

$$m_{OY} = \frac{1 - (-2)}{5 - (-3)} = \frac{3}{8}$$

$$y = mx + b$$

$$4 = -\frac{8}{3}(2) + b$$

$$m_{\perp} = -\frac{8}{3}$$

$$4 + \frac{16}{3} = b$$

$$B(2, 4)$$

$$\frac{28}{3} = b$$

$$\boxed{y = -\frac{8}{3}x + \frac{28}{3}}$$

8) Find the equation of the median \overline{OJ} .

midpt of \overline{BY}

slope of \overline{OJ}

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

$$m_{OJ} = 0$$

$$\boxed{y = 1}$$

$$y = \frac{4 - 2}{2} = 1$$

$$J(-\frac{1}{2}, 1)$$

9) Find the equation of the perpendicular bisector of \overline{OB} .

midpt \overline{OB} :

$$x = \frac{2+5}{2} = \frac{7}{2}$$

$$y = \frac{4+1}{2} = \frac{5}{2}$$

$$(\frac{7}{2}, \frac{5}{2})$$

$$m_{OB} = \frac{4-1}{2-5} = \frac{3}{-3} = -1$$

$$m_{\perp} = 1$$

$$y = mx + b$$

$$\frac{5}{2} = (1)\frac{7}{2} + b$$

$$-\frac{2}{2} = b$$

$$-1 = b$$

$$\boxed{y = x - 1}$$

10) Find G. $G = (2\frac{1}{2}, 3\frac{1}{2})$

$$EQ_{YG} = y = x + 1$$

$$EQ_{OB} = y = -x + 6$$

Use the distance, slope, and midpoint formulas to solve the following problems.

- (11) In an isosceles triangle, at least two sides of a triangle are congruent. Show that the following triangle is isosceles.

A(-3,4), M(3,1), Y(0,-2)

$$d_{AM} = \sqrt{(-3-3)^2 + (4-1)^2} = \sqrt{36+9} = \sqrt{45} = 3\sqrt{5}$$

$$d_{MY} = \sqrt{(3-0)^2 + (1+2)^2} = \sqrt{9+9} = \sqrt{18} = 3\sqrt{2}$$

$$d_{AY} = \sqrt{(-3-0)^2 + (4+2)^2} = \sqrt{9+36} = \sqrt{45} = 3\sqrt{5}$$

Since $AM = AY$, $\triangle AMY$ is an isosceles \triangle .

- (12) Find n so that the line containing A(2,-7) and B(n,9) has a slope of 5.

$$5 = \frac{9 - (-7)}{n - 2}$$

$$5n - 10 = 16$$

$$5n = 26$$

$$n = \frac{26}{5}$$

- (13) M is the midpoint of \overline{AB} . Find the coordinate of B using the midpoint formula.

M(2,1) A(-5,-3)

$$2 = \frac{-5 + x}{2}$$

$$4 = -5 + x$$

$$9 = x$$

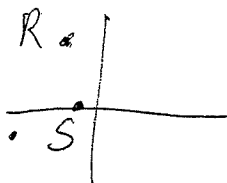
$$1 = \frac{-3 + y}{2}$$

$$2 = -3 + y$$

$$5 = y$$

$$B(9, 5)$$

- (14) R(-2,3), S(-1,0) and T(-4,-1). Show $\angle S$ is right using slope.



$$M_{RS} = \frac{0-3}{-1-2} = \frac{-3}{-1} = 3$$

$$M_{TS} = \frac{-1-0}{-4-1} = \frac{-1}{-5} = \frac{1}{5}$$

$$M_{TR} = \frac{3-1}{-2-4} = \frac{2}{-6} = -\frac{1}{3}$$

Since M_{RS} & M_{TS} are negative reciprocals, $\overline{RS} \perp \overline{TS}$. Therefore, \overline{RS} & \overline{TS} form a rt \angle .