SOLUTIONS => COORDINATE GEOMETRY REVIEW #2

1a) Point => $(-5, 1)$
Slope => $\frac{1}{2}$

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

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

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

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

$2y - 2 = 1x + 5$

$0 = 1x - 2y + 2 + 5$

$0 = 1x - 2y + 7$

b) Point => $(-6, 2)$ or $(5, -3)$

Slope => $m = \frac{y_2 - y_1}{x_2 - x_1}$

$= \frac{-3-2}{5-6}$

$= \frac{-5}{11}$

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

$y - 2 = \frac{-5}{11}(x - (-6))$

$y - 2 = -\frac{5x}{11} - \frac{30}{11}$ (multiply by 11)

$11y - 22 = -5x - 30$

$5x + 11y - 22 + 30 = 0$

$5x + 11y + 8 = 0$

d) Point => (1,6)

Slope => Parallel to $3x+y=4$

$y=-3x+4$

$m=-3$

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

$y-6=-3(x-1)$

$y-6=-3x+3$

$3x+y-6-3=0$

$3x+y-9=0$

d) Point => $(-5, 0)$

Slope => Perpendicular to $-2x - y + 3 = 0$

$-2x + 3 = y$

$m = -2$

$m_{\perp} = \frac{1}{2}$

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

$y - 0 = \frac{1}{2}(x - -5)$

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

$y^{\times 2} = \frac{1}{2}x^{\times 2} + \frac{5}{2}^{\times 2}$

$2y = 1x + 5$

$0 = 1x - 2y + 5$

e) Point => x-int of 4 ; y-int of -3
*(4,0) OR (0,-3)

Slope => $m = \frac{y_2 - y_1}{x_2 - x_1}$

$= \frac{-3-0}{0-4}$

$= \frac{-3}{-4}$

$= \frac{3}{4}$

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

$y - 0 = \frac{3}{4}(x - 4)$

$y^{\times 4} = \frac{3}{4}x^{\times 4} - \frac{12}{4}^{\times 4}$

$4y = 3x - 12$

$0 = 3x - 4y - 12$

f) Point => x-int of 5
(5,0)

Slope => 2

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

$y - 0 = 2(x - 5)$

$y = 2x - 10$

$0 = 2x - y - 10$

g) Point => y-int of 2
(0, 2)

Slope => $\frac{1}{2}$

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

$y - 2 = \frac{1}{2}(x - 0)$

$\overset{\times 2}{y} - \overset{\times 2}{2} = \overset{\times 2}{\frac{1}{2}x}$

$2y - 4 = 1x$

$0 = 1x - 2y + 4$

2. P(-2,-5) Q(-1,6) R(5,-6)

a) Right Bisector for PQ:

① Midpoint of PQ

$$M_{PQ} = \left(\frac{x_2+x_1}{2}, \frac{y_2+y_1}{2}\right)$$
$$= \left(\frac{-1+-2}{2}, \frac{6+-5}{2}\right)$$
$$= \left(\frac{-3}{2}, \frac{1}{2}\right) \leftarrow \text{POINT}$$

② Perpendicular slope of PQ

$$m_{PQ} = \frac{y_2-y_1}{x_2-x_1}$$
$$= \frac{6--5}{-1--2}$$
$$= \frac{11}{1}$$
$$= 11$$

$$m_{\perp} = \frac{-1}{11} \leftarrow \text{SLOPE}$$

③ EQUATION

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

$$y - \frac{1}{2} = -\frac{1}{11}\left(x - -\frac{3}{2}\right)$$

$$y - \frac{1}{2} = -\frac{1}{11}\left(x + \frac{3}{2}\right)$$

$$y - \frac{1}{2}^{\times 22} = -\frac{1}{11}^{\times 22}x - \frac{3}{22}^{\times 22}$$

$$22y - 11 = -2x - 3$$

$$2x + 22y - 11 + 3 = 0$$

$$2x + 22y - 8 = 0$$

b) Altitude from vertex R:

① POINT => R(5, -6)

② Perpendicular slope of PQ

$$m_{PQ} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6 - -5}{-1 - -2} = \frac{11}{1} = 11$$

$m_{\perp} = \frac{-1}{11}$ ← SLOPE

③ EQUATION

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

$$y - -6 = \frac{-1}{11}(x - 5)$$

$$y + 6 = \frac{-1}{11}x + \frac{5}{11} \quad (\times 11)$$

$$11y + 66 = -1x + 5$$

$$1x + 11y + 66 - 5 = 0$$

$$1x + 11y + 61 = 0$$

c) Median from vertex Q:

① Midpoint of PR

$$M_{PR} = \left(\frac{x_2+x_1}{2}, \frac{y_2+y_1}{2}\right)$$
$$= \left(\frac{5+-2}{2}, \frac{-6+-5}{2}\right)$$
$$M = \left(\frac{3}{2}, \frac{-11}{2}\right)$$

② SLOPE of QM

$$m_{QM} = \frac{y_2-y_1}{x_2-x_1}$$
$$= \frac{6--\frac{11}{2}}{-1-\frac{3}{2}}$$
$$= \frac{\frac{6}{1}+\frac{11}{2}}{-\frac{1}{1}-\frac{3}{2}}$$
$$= \frac{\frac{12}{2}+\frac{11}{2}}{-\frac{2}{2}-\frac{3}{2}}$$
$$= \frac{\frac{23}{2}}{\frac{-5}{2}}$$
$$= \frac{23}{2} \times \frac{2}{-5}$$
$$= \frac{46}{-10}$$
$$= -\frac{23}{5}$$ ← SLOPE

③ EQUATION [POINT => *(-1,6) OR $(\frac{3}{2}, \frac{-11}{2})$]

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

$y - 6 = -\frac{23}{5}(x - -1)$

$y - 6 = -\frac{23}{5}(x + 1)$

$y^{x5} - 6^{x5} = -\frac{23}{5}x^{x5} - \frac{23}{5}^{x5}$

$5y - 30 = -23x - 23$

$23x + 5y - 30 + 23 = 0$

$23x + 5y - 7 = 0$

3. Solve by graphing: $x + y = 4$ ① $\quad x - 2y = 10$ ②

① $x+y=4$

$y=-x+4$

$m=\frac{-1}{1}$ (down) (over)

$b=4$

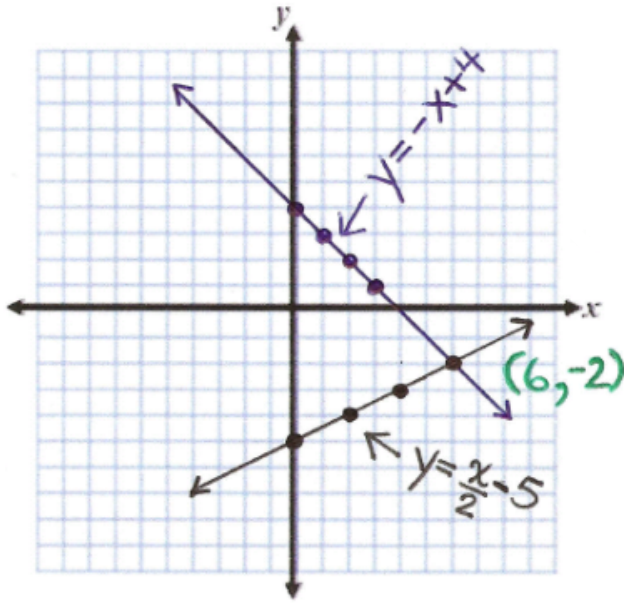
② $x-2y=10$

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

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

$m=\frac{1}{2}$ (up) (over)

$b=-5$



4. $3x+y=2$ ①
$2x+5y=23$ ②

① $3x+y=2$
$y=-3x+2$ sub in ②

② $2x+5y=23$
$2x+5(-3x+2)=23$
$2x-15x+10=23$
$-13x=23-10$
$\frac{-13x}{-13}=\frac{13}{-13}$
$x=-1$ sub in ①

① $3x+y=2$
$3(-1)+y=2$
$-3+y=2$
$y=2+3$
$y=5$

SOLUTION: $(-1,5)$

5. $2x+5y=19$ ①
$3x-y=3$ ②

$5\times$② $15x-5y=15$ ③

① + ③ $\frac{17x}{17}=\frac{34}{17}$

$x=2$ sub in ②

② $3x-y=3$
$3(2)-y=3$
$6-y=3$
$6-3=y$
$3=y$

SOLUTION: $(2,3)$