Answer Key

Analytic Geometry-Lines

$m = -7$

$a = 5$ (x-intercept)

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

$y - 0 = -7(x - 5)$

$y = -7x + 35$

$$\boxed{7x - y - 35 = 0}$$

$b = -5$ (y-intercept)

and parallel to line $6x - 3y = 4$

$6x - 3y = 4$

$[3y = 6x - 4]\ \frac{1}{3}$

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

$m = 2$

for parallel lines $m_1 = m_2$

$y = mx + b$

$y = 2x + (-5)$

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

$A(4,5)$ and $B(-1,2)$

$d_1 = d_2$

$$\sqrt{(x-x_1)^2+(y-y_1)^2} = \sqrt{(x-x_1)^2+(y-y_1)^2}$$

$$(x-4)^2+(y-5)^2 = (x+1)^2+(y-2)^2$$

$$(x^2-8x+16)+(y^2-10y+25) = (x^2+2x+1)+(y^2-4y+4)$$

$$x^2-8x+16+y^2-10y+25 = x^2+2x+1+y^2-4y+4$$

$$-8x-10y+41 = 2x-4y+5$$

$$[-10x-6y+36=0]\,-\frac{1}{2}$$

$$\boxed{5x+3y-18=0}$$

Distance Between Two parallel lines

$$5x - 4y + 11 = 0$$
$$5x - 4y + 3 = 0$$

$$d = \left| \frac{C_2 - C_1}{\sqrt{A^2 + B^2}} \right| = \left| \frac{11 - 3}{\sqrt{5^2 + (-4)^2}} \right|$$

$$d = 1.2494$$

equation of line: $4x + 5y = 6$

point: $(1, 5)$

Distance from point to a line

$$d = \frac{Ax_1 + By_1 + C}{\sqrt{A^2 + B^2}}$$

$$= \frac{4(1) + 5(5) + (-6)}{\sqrt{4^2 + 5^2}}$$

$$d = 3.5920$$

$y = \frac{1}{2}x + 8$

$m_2 = -\frac{1}{m_1}$ lines perpendicular to each other

$m_2 = -\frac{1}{1/2}$

$m_2 = -2$

Hence;

$y = -2x + 8$

$2x + y - 8 = 0$

$$4x + 5y = 15$$

$$y = mx + b$$

$$\left[5y = -4x + 15\right]\frac{1}{5}$$

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

Hence;

$$y\text{-intercept} = 3$$

$m = 2$

$P(3, 4)$

Trial and error:

$x - y = -1$

$3 - 4 = -1$

$-1 = -1$

$b = -4$

$P = (6, 3)$

$y = mx + b$

$3 = m(6) - 4$

$m = 7/6$

$y = 3x + 3$; $m_1 = 3$

$y = 4x + 8$; $m_2 = 4$

$$\tan\theta = \frac{m_2 - m_1}{1 + m_2 m_1} = \frac{4 - 3}{1 + (4)(3)} = 0.07692$$

$$\theta = 4.3987°$$

$b = 3$

$a = 4$

$$\frac{x}{a} + \frac{y}{b} = 1$$

$$\left[\frac{x}{4} + \frac{y}{3} = 1\right](4)(3)$$

$$3x + 4y = 12$$

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

$$y = 6x - 3$$

$$\boxed{m = 6}$$

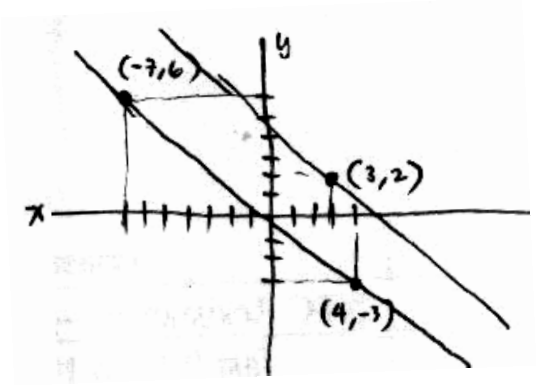
$P(-7, 5)$

trial and error:

$$2x + 7y = 21$$

$$2(-7) + 7(5) = 21$$

$$21 = 21$$



Trial and error

$$y = \frac{9x}{8} - \frac{11}{8}$$

$$y = \frac{9(3)}{8} - \frac{11}{8}$$

$$y = 2$$

Hence;

$$(3, 2)$$

$P_1(-7, -4.3)$

$P_2(6.3, -8.1)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(-8.1 + 4.3)}{(6.3 + 7)} = -\frac{2}{7}$$

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

$$y + 8.1 = -\frac{2}{7}(x - 6.3)$$

$$y + 8.1 = -\frac{2}{7}x + \frac{9}{5}$$

$$\boxed{y = -\frac{2}{7}x - \frac{63}{10}}$$

$P_1(2,3)$

$P_2(9,10)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{10 - 3}{9 - 2} = 1$$

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

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

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

$$\tan\theta = \frac{m_2 - m_1}{1 + m_2 m_1} = \frac{0.9 - 0}{1 + (0.9)(0)} = 0.9$$

$$\theta = 41.9872^\circ$$

Distance between two points

$P_1(0, 6)$

$P_2(7, -2)$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(7 - 0)^2 + (-2 - 6)^2}$$

$$\boxed{d = 10.6301}$$

midpoint ; $P_1(3,6)$

$P_2(-5,-6)$

$$y = \frac{y_2 + y_1}{2} = \frac{-6+6}{2} = 0$$

$$x = \frac{x_2 + x_1}{2} = \frac{-5+3}{2} = -1$$

midpoint $(-1,0)$

Line 1: $3x - 5y = 11$

Line 2: $3x - 5y = 30$

$$d = \frac{C_2 - C_1}{\sqrt{A^2 + B^2}} = \frac{-3 + 11}{\sqrt{3^2 + (-5)^2}}$$

$$d = 1.3720$$

$P(1,3)$

$4x - 3y + 5 = 0$

$\left[3y = 4x + 5\right] \frac{1}{3}$

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

$m_1 = \frac{4}{3} = m_2$

$y - y_1 = m_2(x - x_2)$

$y - 3 = \frac{4}{3}(x - 1)$

$\left[y - 3 = \frac{4}{3}x - \frac{4}{3}\right] 3$

$3y - 9 = 4x - 4$

$\boxed{4x - 3y + 5 = 0}$

$a = 3$

$b = 8$

$$\frac{x}{a} + \frac{y}{b} = 1$$

$$\left[\frac{x}{3} + \frac{y}{8} = 1\right](3)(8)$$

$$8x + 3y = 24$$

$b = -9$

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

$y = mx + b$

$\left[y = \frac{5}{4}x - 9\right]4$

$4y = 5x - 36$

$\boxed{5x - 4y - 36 = 0}$

$$y = 6 - 4t$$

$$x = 3 + t$$

$$t = x - 3$$

Substi

$$y = 6 - 4(x - 3)$$

$$y = 6 - 4x + 12$$

$$y = -4x + 18$$

$$\boxed{m = -4}$$

$4x + 3y - 8 = 0$ perpendicular to $3x - Ay + 3 = 0$

$$[3y = -4x + 8]\ \frac{1}{3}$$

$$y = -\frac{4}{3}x + \frac{8}{3}$$

$$m_1 = -\frac{4}{3}$$

$$m_2 = -\frac{1}{m_1} = -\frac{1}{(-4/3)} = \frac{3}{4}$$

from;

$$3x - Ay + 3 = 0$$

$$Ay = 3x + 3$$

$$y = \frac{3}{A}x + \frac{3}{A}$$

$$m = \frac{3}{A} = \frac{3}{4}$$

Hence; $\boxed{A = 4}$

$P_1(2, -4)$

$P_2(-5, 3)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 + 4}{-5 - 2} = -1$$

and;

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

$$y + 4 = -1(x - 2)$$

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

$$\boxed{y = -x - 2}$$

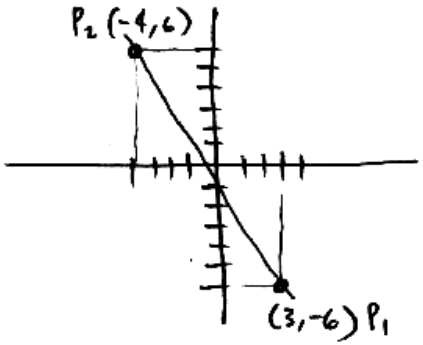
$P_1(-3,1)$
$P_2(5,0)$
$P_3(4,4)$

$$A = \frac{1}{2}\begin{bmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{bmatrix}$$

$$A = \frac{1}{2}\begin{bmatrix} -3 & 1 & 1 \\ 5 & 0 & 1 \\ 4 & 4 & 1 \end{bmatrix}$$

$$A = \frac{1}{2}(31)$$

$$A = 15.5 \text{ sq. units}$$



$$x = \frac{x_1 r_2 + x_2 r_1}{r_2 + r_1} \quad ; \quad y = \frac{y_1 r_2 + y_2 r_1}{r_2 + r_1}$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{(-4-3)^2 + (6+6)^2}$$

$$d = 13.8924$$

$$r_1 = 13.8924\left(\frac{3}{5}\right) = 8.3355$$

$$r_2 = 13.8924 - 8.3355 = 5.5570$$

Substi

$$x = \frac{(3)(5.5570) + (-4)(8.3355)}{5.5570 + 8.3355}$$

$$x = -6/5$$

$$y = \frac{(-6)(5.5570) + (6)(8.3355)}{5.5570 + 8.3355}$$

$$y = \frac{6}{5}$$

Hence;

$$(-6/5, 6/5)$$