Math 10D

Name_____

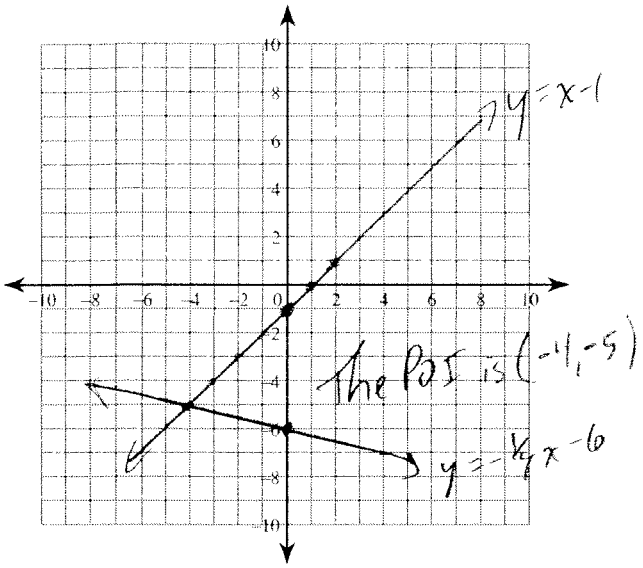
Units 1 and 2 Review

Date_____

Solve each system by graphing.

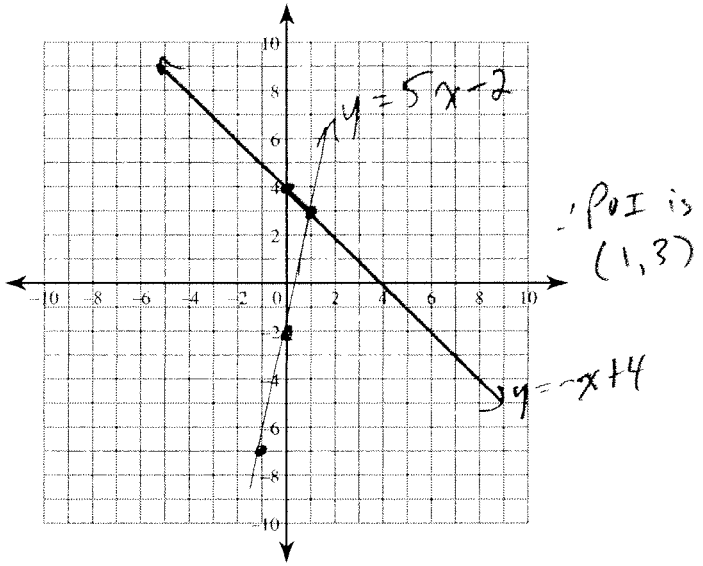
1) $y = x - 1$

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



2) $0 = 8 - 2x - 2y \rightarrow 2y = -2x + 8 \rightarrow y = -x + 4$

$-2 + 5x = y \rightarrow y = 5x - 2$



Solve each system by substitution.

3) ① $-4x + 5y = -8$

② $y = -6x + 12$

① $-4x + 5(-6x + 12) = -8$

$-4x - 30x + 60 = -8$

$-34x = -68$

$x = 2$

② $y = -6(2) + 12$

$y = -12 + 12$

$y = 0$

∴ the POI is $(2, 0)$

4) ① $-4x - 2y = 14$

$3x + 3y = -6 \rightarrow 3x = -3y - 6$

② $x = -y - 2$

① $-4(-y - 2) - 2y = 14$

$+4y + 8 - 2y = 14$

$2y = 6$

$y = 3$

② $x = -(3) - 2$

$x = -5$

∴ the POI is $(-5, 3)$

Solve each system by elimination.

5) $-x - 6y = 13$ ①

$+ (x + 8y = -17)$ ②

$0x + 2y = -4$

$2y = -4$

$y = -2$

① $-x - 6(-2) = 13$

$-x + 12 = 13$

$-x = 1$

$x = -1$

∴ the POI is $(-1, -2)$

6) $(7x + 2y = 21) \times 3 \rightarrow 21x + 6y = 63$

② $2x - 3y = -19 \times 2 \rightarrow +(4x - 6y = -38)$

$25x + 0y = 25$

$25x = 25$

$x = 1$

② $2(1) - 3y = -19$

$2 - 3y = -19$

$-3y = -21$

$y = 7$

∴ the POI is $(1, 7)$

7) Mixed nuts which cost \$10/kg are made by combining walnuts which cost \$11/kg with peanuts which cost \$6/kg. Find the number of kg of walnuts and peanuts required to make 10 kg of mixed nuts.

let w be kg of walnuts
let p be kg of peanuts

$11w + 6p = 10(10) \rightarrow 11w + 6p = 100$ ①

$w + p = 10 \rightarrow w = 10 - p$ ②

① $11(10-p) + 6p = 100$

$110 - 11p + 6p = 100$

$-5p = -10$

$p = 2$

② $w = 10 - 2$

$w = 8$

∴ they need 8 kg of walnuts and 2 kg of peanuts.

Find the midpoint of the line segment with the given endpoints.

8) (–8, 5), (2, –2)
$(x_1, y_1)\ (x_2, y_2)$

$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right) = \left(\frac{-8+2}{2}, \frac{5+-2}{2}\right) = (-3, 1.5)$

Find the distance between each pair of points.

9) (–7, 4), (–7, –8)
$(x_1, y_1)\ (x_2, y_2)$

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

$= \sqrt{(-7 - -7)^2 + (-8 - 4)^2}$

$= \sqrt{(0)^2 + (-12)^2}$

$= \sqrt{144} = \boxed{12 = D}$

Find the slope of the line through each pair of points.

10) (2, –2), (1, –14)
$(x_1, y_1)(x_2, y_2)$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-14 - -2}{1 - 2} = \frac{-12}{-1} = 12$

Find the slope of a line perpendicular to each given line.

11) $y = \boxed{-\frac{3}{5}}x - 2$

$m = -\frac{3}{5}$ ⊥ is: $\boxed{\frac{5}{3}}$

Write the slope-intercept form of the equation of the line through the given points.

12) through: (–4, 4) and (–5, –1)
$(x_1, y_1)\ (x_2, y_2)$

$m = \frac{-1 - 4}{-5 - -4} = \frac{-5}{-1} = 5$

slope point

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

$y - 4 = 5(x - -4)$

$y - 4 = 5(x + 4)$

$y - 4 = 5x + 20$

$\boxed{y = 5x + 24}$

Write the slope-intercept form of the equation of the line described.

13) through: (2, 3), perp. to $y = -\frac{2}{5}x - 5$

(x, y_1)

$m \rightarrow \perp$ is $\frac{5}{2}$

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

$y - 3 = \frac{5}{2}(x - 2)$

$y - 3 = \frac{5}{2}x - 5$

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

14) Given the equation $x^2 + y^2 = 60$ Is the point (-4,7) inside, on, or outside the circle?

x, y

$(-4)^2 + (7)^2$

$16 + 49$

$65 > 60$

greater therefore $(-4, 7)$ is outside

15) The point (8,12) lies on a circle centred around the origin. What is the equation to the circle?

$x^2 + y^2 = r^2$

$(8)^2 + (12)^2 = r^2$

$64 + 144 = r^2$

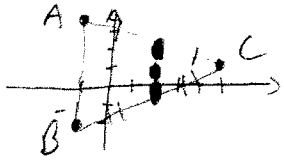
$208 = r^2$

$\sqrt{208} = r$

equation of a circle: $x^2 + y^2 = (\sqrt{208})^2$

$x^2 + y^2 = 208$

16) Given triangle ABC with A(-1,4), B(-1,-2), C(5,1),show that the midsegment from AC to BC is parallel to the line segment AB



17) Given triangle XYZ with X (-1, 6), Y(-4, 0) and Z(3, 2), draw median from vertex X. Calculate the slope of the median.

$M_{AC} = \left(\frac{-1+5}{2}, \frac{4+1}{2}\right) = (2, 2.5)$

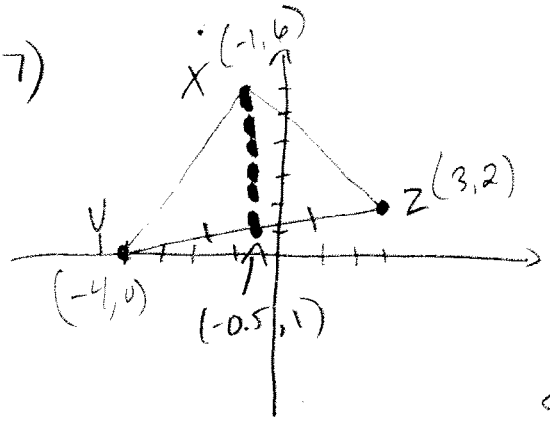
$M_{BC} = \left(\frac{-1+5}{2}, \frac{-2+1}{2}\right) = (2, -0.5)$

slope $\rightarrow m = \frac{2.5 - -0.5}{2 - 2} = \frac{2}{0}$ undefined

slope of AB $m_{AB} = \frac{-2-4}{-1--1} = \frac{-6}{0}$ undefined

the midsegment and AB are parallel.

17)



midpoint $\overline{YZ}$

$$M_{YZ} = \left(\frac{-4+3}{2}, \frac{0+2}{2}\right)$$

$$= (-0.5, 1)$$

Slope of the median

$(-0.5, 1)$ to $(-1, 6)$

$$m = \frac{6-1}{-1--0.5}$$

$$m = \frac{5}{-0.5}$$

$$\boxed{m = 10}$$

Math 10D Name_____

Unit 2 Review Week - Coordinate Geometry

1) Some words to keep in mind:

Parallel -

median -

Perpendicular -

bisector -

Midsegment -

circle -

Scalene, isosceles and equilateral -

Rectangle, parallelogram, square and rhombus -

Find the midpoint of the line segment with the given endpoints.

2) $(3, 5)$, $(-2, 1)$

$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

$M = \left(\frac{3 + -2}{2}, \frac{5 + 1}{2}\right)$

$= \left(\frac{1}{2}, 3\right)$

3) $(0, 9)$, $(5, -9)$

$M = \left(\frac{0+5}{2}, \frac{9 + -9}{2}\right)$

$= \left(2\frac{1}{2}, 0\right)$

Given the midpoint and one endpoint of a line segment, find the other endpoint.

4) Endpoint: $(9, -10)$, midpoint: $(-2, 9)$ M

$\frac{x_1 + x_2}{2} \Rightarrow \frac{9 + x}{2} = -2$

$9 + x = -4$

$x = -13$

$\frac{y_1 + y_2}{2} \Rightarrow \frac{-10 + y}{2} = 9$

$-10 + y = 18$

$y = 28$

Endpoint $(-13, 28)$

5) Endpoint: $(6, -6)$, midpoint: $(4, -2)$

$\frac{x_1 + x_2}{2} \Rightarrow \frac{6 + x}{2} = 4$

$6 + x = 8$

$x = 2$

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

$-6 + y = -4$

$y = 2$

Endpoint $(2, 2)$

Find the distance between each pair of points.

6) $(-5, 4)$, $(-7, -6)$ — x_1, y_1; x_2, y_2

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

$$D = \sqrt{(-7 - -5)^2 + (-6 - 4)^2}$$

$$= \sqrt{(-2)^2 + (-10)^2}$$

$$= \sqrt{4 + 100}$$

$$D = \sqrt{104}$$

7) $(-8, -8)$, $(-4, 3)$ — x_1, y_1; x_2, y_2

$$D = \sqrt{(-4 - -8)^2 + (3 - -8)^2}$$

$$= \sqrt{(4)^2 + (11)^2}$$

$$= \sqrt{16 + 121}$$

$$D = \sqrt{137}$$

Find the slope of the line through each pair of points.

8) $(15, 4)$, $(-8, 1)$ — x_1, y_1; x_2, y_2

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

$$m = \frac{1 - 4}{-8 - 15} = \frac{-3}{-23} = \frac{3}{23}$$

9) $(-12, 12)$, $(-18, 17)$ — x_1, y_1; x_2, y_2

$$m = \frac{17 - 12}{-18 - -12} = \frac{5}{-6}$$

10) Given the points A $(9,2)$, B $(-3,4)$ and C $(-5,-3)$, determine if the triangle is scalene, isosceles or equilateral WITHOUT GRAPHING.

$\overline{AB} \Rightarrow D = \sqrt{(-3-9)^2 + (4-2)^2} = \sqrt{(-12)^2 + (2)^2} = \sqrt{144 + 4} = \sqrt{148}$

$\overline{AC} \Rightarrow D = \sqrt{(-5-9)^2 + (-3-2)^2} = \sqrt{(-14)^2 + (-5)^2} = \sqrt{196 + 25} = \sqrt{221}$

$\overline{BC} \Rightarrow D = \sqrt{(-5 - -3)^2 + (-3-4)^2} = \sqrt{(-2)^2 + (-7)^2} = \sqrt{4 + 49} = \sqrt{53}$

Since all 3 lengths are different, the triangle is scalene.