

## Chapter 2 Review Package

### Midpoint

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

1) (7,4) and (9,-1)

$$= \left( \frac{7+9}{2}, \frac{4+(-1)}{2} \right)$$

$$= \left( \frac{16}{2}, \frac{3}{2} \right)$$

$$= \left( 8, \frac{3}{2} \right)$$

3) (8,-9) and (0,5)

$$= \left( \frac{8+0}{2}, \frac{-9+5}{2} \right)$$

$$= \left( \frac{8}{2}, \frac{-4}{2} \right)$$

$$= (4, -2)$$

2) (1,-7) and (1,-12)

$$= \left( \frac{1+1}{2}, \frac{-7+(-12)}{2} \right)$$

$$= \left( 1, \frac{-19}{2} \right)$$

4) (3/2, -1/2) and (2, 5/2)

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

$$= \left( \frac{7}{4}, \frac{2}{2} \right)$$

$$= \left( \frac{7}{4}, 1 \right)$$

### Length

Find the distance between each pair of points. Round your answer to the nearest tenth

1) (7,3) and (-1,-4)

$$= \sqrt{(-1-7)^2 + (-4-3)^2}$$

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

$$= \sqrt{64+49}$$

$$= \sqrt{113}$$

2) (6,-7) and (3,-5)

$$= \sqrt{(3-6)^2 + (-5-(-7))^2}$$

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

$$= \sqrt{9+4}$$

$$= \sqrt{13}$$

3) (3,-5) and (-3,0)

$$= \sqrt{(-3-3)^2 + (0-(-5))^2}$$

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

$$= \sqrt{36+25}$$

$$= \sqrt{61}$$

4) (5,1) and (5,-6)

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

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

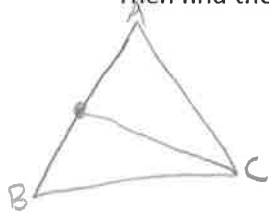
$$= \sqrt{49}$$

$$= 7$$

Median

- 1) Draw the triangle with vertices A(-1,3) B(1,5) and C(3,1). Draw the median from vertex C to AB.

Then find the equation of this median.



$$\textcircled{1} \text{ Mid}_{AB} = \left( \frac{-1+1}{2}, \frac{3+5}{2} \right)$$

$$= \left( \frac{0}{2}, \frac{8}{2} \right)$$

$$D = (0, 4)$$

$$\textcircled{2} m_{CD} = \frac{1-4}{3-0}$$

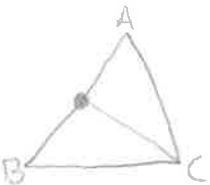
$$= \frac{-3}{3}$$

$$= -1$$

$$\textcircled{3} 4 = (-1)(0) + b \quad \textcircled{4} y = -x + 4$$
$$4 = b$$

- 2) Draw the triangle with vertices A(3,4) B(-5,2) and C(1,-4). Draw the median from vertex C to AB.

Then find the equation of this median.



$$\textcircled{1} \text{ Mid}_{AB} = \left( \frac{3+(-5)}{2}, \frac{4+2}{2} \right)$$

$$= \left( \frac{-2}{2}, \frac{6}{2} \right)$$

$$D = (-1, 3)$$

$$\textcircled{2} m_{CD} = \frac{-4-3}{1-(-1)}$$

$$= \frac{-7}{2}$$

$$\textcircled{3} 3 = \left( \frac{-7}{2} \right) (-1) + b$$

$$3 = \frac{7}{2} + b$$

$$\frac{6}{2} - \frac{7}{2} = b$$

$$-\frac{1}{2} = b$$

$$\textcircled{4} y = -\frac{7}{2}x - \frac{1}{2}$$

Right Bisector

- 1) Determine the equation for the right bisector of the line segment with endpoints A(-2,-4) and B(8,6)

$$\begin{aligned} \textcircled{1} m_{AB} &= \frac{-4-6}{-2-8} \\ &= \frac{-10}{-10} \\ &= 1 \end{aligned}$$

$$\textcircled{2} \perp m = -1$$

$$\begin{aligned} \textcircled{3} \text{Mid}_{AB} &= \left( \frac{-2+8}{2}, \frac{6+(-4)}{2} \right) \\ &= \left( \frac{6}{2}, \frac{2}{2} \right) \\ &= (3, 1) \end{aligned}$$

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

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

- 2) Determine the equation for the right bisector of the line segment with endpoints A(2,6) and B(8,10)

$$\begin{aligned} \textcircled{1} m_{AB} &= \frac{6-10}{2-8} \\ &= \frac{-4}{-6} \\ &= \frac{2}{3} \end{aligned}$$

$$\textcircled{2} \perp m = -\frac{3}{2}$$

$$\begin{aligned} \textcircled{3} \text{Mid}_{AB} &= \left( \frac{2+8}{2}, \frac{6+10}{2} \right) \\ &= \left( \frac{10}{2}, \frac{16}{2} \right) \\ &= (5, 8) \end{aligned}$$

$$\begin{aligned} \textcircled{4} 8 &= \left(-\frac{3}{2}\right)(5) + b \\ 8 &= -\frac{15}{2} + b \\ \frac{16}{2} + \frac{15}{2} &= b \\ \frac{31}{2} &= b \end{aligned}$$

$$\boxed{y = -\frac{3}{2}x + \frac{31}{2}}$$

**Applying Formulas**

1. The vertices of a triangle are D(-4, -2), E(-2, 6), and F(6, -4).

a) Classify  $\triangle DEF$  as scalene, isosceles, or equilateral. Explain your reasoning. (4 marks)

$$\begin{aligned} \text{Length } DE &= \sqrt{(-2 - (-4))^2 + (6 - (-2))^2} \\ &= \sqrt{(2)^2 + (8)^2} \\ &= \sqrt{4 + 64} \\ &= \sqrt{68} \end{aligned}$$

$$\begin{aligned} \text{Length } EF &= \sqrt{(-2 - 6)^2 + (6 - (-4))^2} \\ &= \sqrt{(-8)^2 + (10)^2} \\ &= \sqrt{64 + 100} \\ &= \sqrt{164} \end{aligned}$$

$$\begin{aligned} \text{Length } DF &= \sqrt{(-4 - 6)^2 + (-2 - (-4))^2} \\ &= \sqrt{(-10)^2 + (2)^2} \\ &= \sqrt{100 + 4} \\ &= \sqrt{104} \end{aligned}$$

$\therefore$  Scalene

b) Determine whether it is a right triangle. (4 marks)

$$\sqrt{68}^2 + \sqrt{104}^2 = \sqrt{164}^2$$

$$68 + 104 = 164$$

$$172 \neq 164$$

$\therefore$  not a right  $\triangle$

2. A skateboard retailer has two locations in a city that are identified on a map by the coordinates  $(23, 17)$  and  $(1, -3)$ .

a) How far apart are the two stores?

$$= \sqrt{(23-1)^2 + (17-(-3))^2}$$

$$= \sqrt{(22)^2 + (20)^2}$$

$$= \sqrt{484 + 400}$$

$$= \sqrt{884}$$

$$= 29.7$$

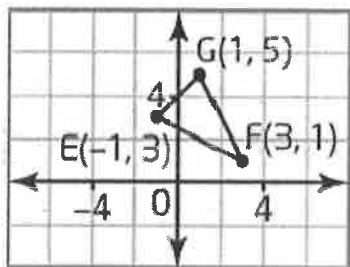
b) If the owner opens a new store halfway between the two locations, what are the coordinates of the new store?

$$\text{Mid} = \left( \frac{23+1}{2}, \frac{17+(-3)}{2} \right)$$

$$= \left( \frac{24}{2}, \frac{14}{2} \right)$$

$$= (12, 7)$$

3) Refer to the triangle below.



Find the length of the median from vertex E.

$$\begin{aligned} \text{Mid } GF &= \left( \frac{1+3}{2}, \frac{5+1}{2} \right) \\ &= \left( \frac{4}{2}, \frac{6}{2} \right) \\ &= (2, 3) \end{aligned}$$

$$\begin{aligned} \text{Length } AE &= \sqrt{(-1-2)^2 + (3-3)^2} \\ &= \sqrt{(-3)^2} \\ &= \sqrt{9} \\ &= 3 \end{aligned}$$

Circles

- 1) Write the equation of the circle centered at the origin with a radius of 7

$$x^2 + y^2 = 7^2$$

$$x^2 + y^2 = 49$$

2)

- a. Find the equation of the circle that is centered at the origin and passes through the point  $(-3, 4)$ .

$$(-3)^2 + (4)^2 = r^2$$

$$9 + 16 = r^2$$

$$25 = r^2$$

$$x^2 + y^2 = 25$$

- b. Does the point  $(5, 2)$  lie on the circle, inside of it, or outside of it?

$$5^2 + 2^2 = 25$$

$$25 + 4 = 29$$

$$29 > 25$$

∴ outside

## Answer Key

**Midpoint:** 1)  $(8, 3/2)$  2)  $(1, -19/2)$  3)  $(4, -2)$  4)  $(7/4, 1)$

**Length:** 1) 10.6 2) 3.6 3) 7.8 4) 7

**Medians:** 1)  $y = -x + 4$  2)  $y = -\frac{7}{2}x - \frac{1}{2}$

**Right Bisectors:** 1)  $y = -x + 4$  2)  $y = -\frac{3}{2}x + \frac{31}{2}$

**Applications:** 1a)  $DE = \sqrt{68}$ ,  $DF = \sqrt{104}$ ,  $EF = \sqrt{164}$  No equal sides, therefore it is a scalene triangle 1b) Not at right triangle 2a) 29.7 units 2b)  $(12, 7)$  3) 3

**Circles:** 1)  $x^2 + y^2 = 49$  2a)  $x^2 + y^2 = 25$  2b) outside

## Chapter 2 Review from Textbook:

Midpoint – Pg. 100 # 1, 2 and Pg. 104 # 1, 4

Length – Pg. 101 # 6, 7, 8 and Pg. 104 # 2

Median and Right Bisector – Pg. 100 # 4abd and Pg. 104 # 9a

Circles – Pg. 102 # 14, 15 and Pg. 103 # 10

Application of Formulas – Pg. 101 # 9abc, 11, 12 and Pg. 104 # 8