Name: Key

Date:

UNIT 7 **LESSON 7**

AIM: HOW DO WE DETERMINE THE LENGTH BETWEEN TWO POINTS?

Finding length given two coordinates (x, y).

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

$x_1 y_1$ $x_2 y_2$

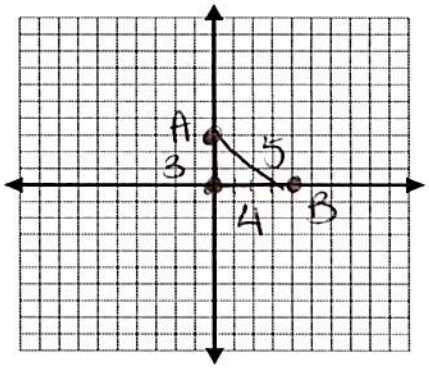
1. The coordinates of point A are $(0,3)$, the coordinates of point B are $(4,0)$ and the coordinates of point C are $(0,0)$. What is the length of $\overline{AB}$?

check = $3^2 + 4^2 = 5^2$? ✓

$d = \sqrt{(0-3)^2 + (4-0)^2}$

$d = \sqrt{25}$

$\boxed{d = 5}$



$x_1 y_1$ $x_2 y_2$

2. The coordinates of point A are $(4,8)$, the coordinates of point B are $(4,2)$ and the coordinates of point C is $(1,2)$. What is the length of $\overline{AC}$, in simplest radical form?

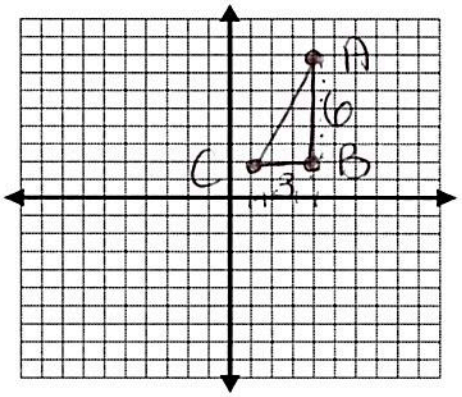
check: $3^2 + 6^2 = (3\sqrt{5})^2$? ✓

$d = \sqrt{(1-4)^2 + (2-8)^2}$

$d = \sqrt{45}$

$\sqrt{9}\ \sqrt{5}$

$\boxed{d = 3\sqrt{5}}$



$x_1 y_1$ $x_2 y_2$

3. The point $(5,4)$ lies on a circle. What is the length of the **diameter** of this circle if the center is located at $(3,2)$ in simplest radical form?

2 x radius check: $2^2 + 2^2 = (2\sqrt{2})^2$

$8 = 8$ ✓

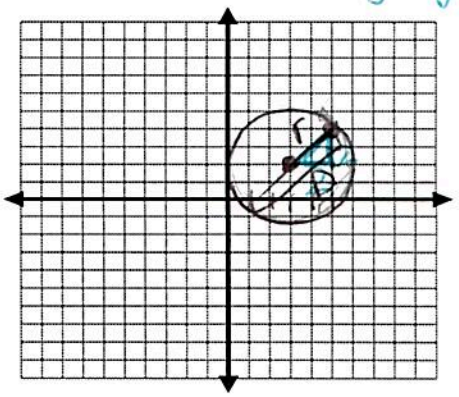
$d = \sqrt{(3-5)^2 + (2-4)^2}$

$d = \sqrt{8}$

$\sqrt{4}\ \sqrt{2}$

$d = 2\sqrt{2} \times 2 = \boxed{4\sqrt{2}}$

*only mult. coefficient!



4. The coordinates of rectangle ABCD are $A(0,2)$, $B(4,8)$, $C(7,6)$ and $D(3,0)$. Show that the diagonals are equal in length.

$x_1\ y_1$ $x_2\ y_2$

$x_1\ y_1$ $x_2\ y_2$

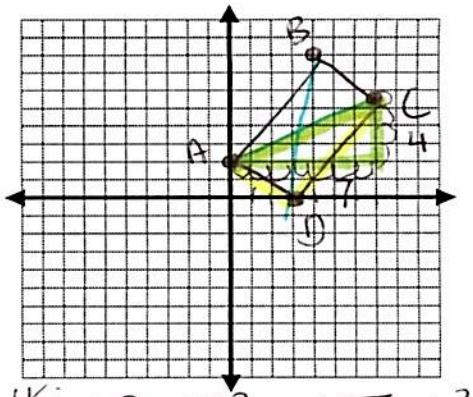
$d_{\overline{AC}} = \sqrt{(7-0)^2+(6-2)^2}$

$= \sqrt{65}$

$d_{\overline{BD}} = \sqrt{(3-4)^2+(0-8)^2}$

$= \sqrt{65}$

$\therefore \overline{AC} \cong \overline{BD}$ so diagonals are $\cong$



check: $4^2 + 7^2 = (\sqrt{65})^2$

$65 = 65$ ✓

5. Given triangle DEF with coordinates D(2, 3), E(7, 5) and F(4, -2).

a. Find the length of each side of triangle DEF

$\overline{DE} = \sqrt{(7-2)^2+(5-3)^2} = \sqrt{29}$

$\overline{EF} = \sqrt{(4-7)^2+(-2-5)^2} = \sqrt{58}$

$\overline{DF} = \sqrt{(4-2)^2+(-2-3)^2} = \sqrt{29}$

b. Based on part *a*, what type of triangle is DEF? Explain.

ΔDEF is an isosceles Δ b/c 2 sides are $\cong$.

6. The coordinates of the vertices of ΔDEF are D(-2,0),E(4,0), and F(1,$3\sqrt{3}$)

a. Find the length of DE, EF, and FD

$\overline{DE} = \sqrt{(4-2)^2+(0-0)^2} = \sqrt{36} = 6$

$\overline{EF} = \sqrt{(1-4)^2+(3\sqrt{3}-0)^2} = \sqrt{36} = 6$

$\overline{DF} = \sqrt{(1-2)^2+(3\sqrt{3}-0)^2} = \sqrt{36} = 6$

b. Is ΔEDF equilateral? Justify your answer.

yes Δ EDF is equilateral b/c all sides are $\cong$

REVIEW:

1. Line segment RW has endpoints $R(-4,5)$ and $W(6,20)$. Point P is on RW such that $RP:PW$ is 2:3. What are the coordinates of point P?

$x_1 y_1$ $x_2 y_2$

$K = \frac{2}{5}$

$\left(-4 + \frac{2}{5}(6-4), 5 + \frac{2}{5}(20-5)\right)$

$(0, 11)$

1) (2,9)

2) (0,11)

3) (2,14)

4) (10,2)

2. A parallelogram must be a rectangle if its diagonals 1) bisect each other. 2) bisect the angles to which they are drawn. 3) are perpendicular to each other. 4) are congruent.	3. Which statements describe the properties of a trapezoid? 1) The bases are parallel. 2) The diagonals are congruent. 3) The opposite angles are congruent. 4) The base angles are congruent.
4. Which of the following reasons is valid for proving a quadrilateral is a parallelogram? 1) Diagonals bisect angles 2) All sides are congruent 3) One pair of opposite sides are parallel 4) One pair of opposite sides are both parallel and congruent	5. Which of the following reasons is NOT valid for proving a parallelogram is a rhombus? (1) Diagonals bisect angles ✓ (2) All sides are congruent ✓ (3) Diagonals are congruent only in rectangle! (4) Diagonals are perpendicular ✓
6. Which of the following reasons is valid for proving a parallelogram is a rectangle? (1) Diagonals bisect angles (2) Both pairs of opposite sides are congruent (3) Diagonals are congruent (4) Diagonals are perpendicular ↳ only in rhombus!	7. The diagonals of a quadrilateral are congruent but do not bisect each other. This quadrilateral is 1) an isosceles trapezoid 2) a parallelogram X 3) a rectangle X 4) a rhombus X

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UNIT 7

LESSON 7 HOMEWORK

1. The center of circle O has coordinates $(6,4)$. If circle O passes through $(-9,-4)$, what is the length of its diameter?

$x_1 y_1$ $x_2 y_2$

$d = \sqrt{(-9-6)^2+(-4-4)^2} = \sqrt{289} = 17 \times 2 = \boxed{34}$

2. The endpoints of one side of a regular octagon are $(-1,4)$ and $(2,3)$. What is the perimeter of the octagon?

HINT: Regular polygons have equal sides and equal angles!

1) $\sqrt{10}$
2) $8\sqrt{10}$
3) $8\sqrt{2}$
4) $64\sqrt{2}$

$x_1 y_1$ $x_2 y_2$

$d = \sqrt{(2-(-1))^2+(3-4)^2} = 1\sqrt{10} \times 8 = \boxed{8\sqrt{10}}$

only mult. coefficient!

3. The vertices of square $RSTV$ have coordinates $R(-1,5)$, $S(-3,1)$, $T(-7,3)$, and $V(-5,7)$. What is the perimeter of $RSTV$?

$RS = \sqrt{(-3-(-1))^2+(1-5)^2} = 1\sqrt{20} \times 4 = \boxed{4\sqrt{20}}$

1) $\sqrt{20}$
2) $\sqrt{40}$
3) $4\sqrt{20}$
4) $4\sqrt{40}$

only mult. coefficient

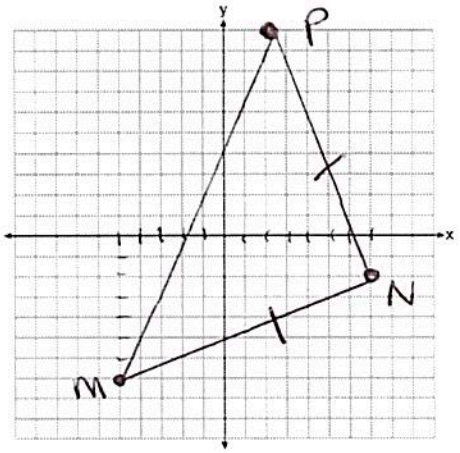
4. If ΔMNP has vertices at $M(-5,-7)$, $N(7,-2)$ and $P(2,10)$. Is ΔMNP isosceles? Explain your answer.

$\overline{MN} = \sqrt{(7-(-5))^2+(-2-(-7))^2} = \sqrt{169} = 13$

$\overline{NP} = \sqrt{(2-7)^2+(10-(-2))^2} = \sqrt{169} = 13$

$\overline{MP} = \sqrt{(2-(-5))^2+(10-(-7))^2} = \sqrt{338}$

yes ΔMNP is isosceles b/c 2 sides are $\cong$ ($MN \cong NP$)



5. Directed segment $\overline{AB}$ is drawn from A(-7,-4) to B(0,10). Find point C that partition $\overline{AB}$ in the ratio 5:2.

$x_1 y_1$ $x_2 y_2$

$\left(-7+\frac{5}{7}(0-(-7)), -4+\frac{5}{7}(10-(-4))\right)$

$K = \frac{5}{7}$

$\boxed{(-2, 6)}$