WS 9.17 Unit 9 Study Guide Name: Key

Directions: Determine if the lines are parallel, perpendicular, or coincidental. Explain why.

1) $\begin{cases} y = -2x - 3 \\ y = -2x + 3 \end{cases}$

Same slope: $\boxed{\text{parallel}}$

2) $\begin{cases} 2y - 8x = -10 \\ y = 4x - 5 \end{cases}$

Same line: $\boxed{\text{coincidental}}$

$2y - 8x = -10$
$+8x \quad +8x$
$2y = 8x - 10$
$y = 4x - 5$

3) $\begin{cases} y = -\frac{1}{3}x + 3 \\ y = 3x + 3 \end{cases}$

opposite reciprocal slopes: $\boxed{\text{perpendicular}}$

Directions: Write an equation of a line with the following characteristics.

4) Is perpendicular to the equation y = 2x – 5 and has a y-intercept of 3.

opp reciprocal: $-\frac{1}{2}$

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

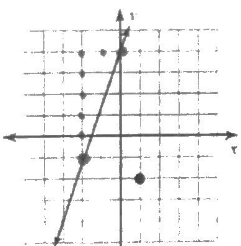
$\boxed{y = -\frac{1}{2}x + 3}$

5) Is parallel to the equation y = 5x + 3.

$m = 5$ $\boxed{y = 5x \pm \text{any } \#}$

Directions: Find each equation…

6) … that is parallel to the given line & passes through the given point.



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

$y = mx + b$

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

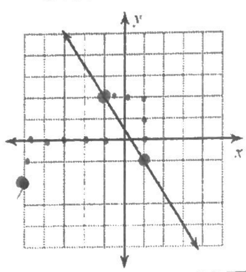
$-2 = \frac{5}{2} + b$

$-\frac{5}{2} \quad -\frac{5}{2}$

$-.5 = b$

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

7) … that is ⊥ to the given line & passes through the given point.



Old: $m = -\frac{3}{2}$

New line slope: $m = \frac{2}{3}$

$(-5, -2)$ $x\ y$

$y = mx + b$

$-2 = \frac{2}{3}(-5) + b$

$-2 = -\frac{10}{3} + b$

$+\frac{10}{3} \quad +\frac{10}{3}$

$1.33 = b$

$\boxed{y = \frac{2}{3}x + 1.33}$

Directions: Find the distance between each set of coordinates. Round your answer to the nearest tenth.

8) A(2, 5) & B(20, 5)

$x_1\ y_1 \quad x_2\ y_2$

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

$\sqrt{(20-2)^2 + (5-5)^2}$

$\sqrt{324 + 0} = \sqrt{324} = \boxed{18}$

9) C(1, 6) & D(-4, 0)

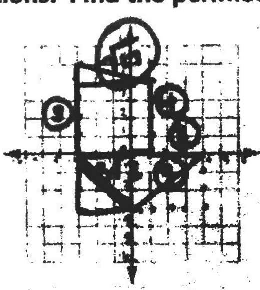
$\sqrt{(-4-1)^2 + (0-6)^2}$

$\sqrt{(25 + 36)}$

$\boxed{\sqrt{61}}$

Directions: Find the perimeter and area of each shape.

10)



Perimeter:

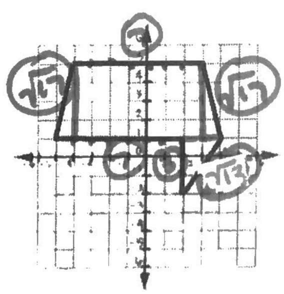
$5 + 4 + 3 + 3\sqrt{2} + 5 + \sqrt{17} =$

$\boxed{25.37}$

Area: $2 + 16 + 10.5 =$

$\boxed{28.5}$

11)



Perimeter:

$7 + 7 + 3 + \sqrt{13} + \sqrt{12} + \sqrt{17} =$

$\boxed{28.85}$

Area: $2 + 2 + 28 + 3 =$

$\boxed{35}$

Directions: Solve each problem.

12) If W(3, –4) is an endpoint of segment WT and the midpoint is (5, –2). What is the ordered pair that represents Point T?

$\boxed{(7,0)}$

x: $2 \cdot 5 = \frac{3+x}{2} \cdot 2$

$10 = 3 + x$
$-3 \quad -3$
$7 = x$

y: $2 \cdot -2 = \frac{-4+y}{2} \cdot 2$

$-4 = -4 + y$
$+4 \quad +4$
$y = 0$

13) R(5, –5) and S(–3, 1) have a midpoint of (a, b). What is the value of a and b?

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

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

14) Segment RJ is partitioned at Point Q at a ratio of 3:5. If R(–1, 8) and J(15, 0). What is Point Q?

a b; $x_1 y_1$; $x_2 y_2$

$\left(x_1 + \frac{a}{a+b}(x_2 - x_1),\ y_1 + \frac{a}{a+b}(y_2 - y_1)\right)$

$-1 + \left(\frac{3}{8}\right)(15+1)$ $8 + \left(\frac{3}{8}\right)(0-8)$

5 5 $\boxed{(5,5)}$

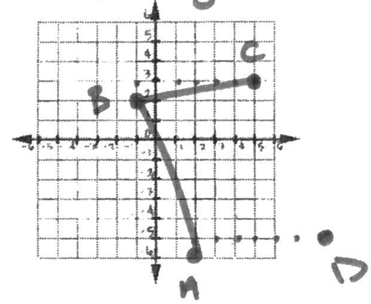
15) Cameron partitioned a segment at a ratio of 1:1. Lucy said she could split this segment another way. Explain how this is possible?

A ratio with the same # of parts is just cutting the segment in half. Finding midpoint is the same thing.

16) Three vertices of parallelogram *ABCD* are *A* (2, –6), *B* (–1, 2), and *C*(5, 3). Find the coordinates of vertex *D*.

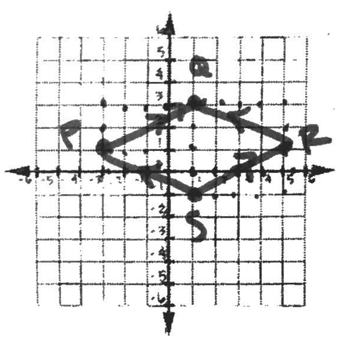
- Count from B to C.
- Do the same from A to D.

(up 1 over 6)



Directions: Plot the points and complete the coordinate proof.

17) Quadrilateral PQRS: P (-3, 1) Q (1, 3) R (5, 1) S (1, -1)



Prove parallelogram:

Slopes of $\overline{PS}: -\frac{2}{4} = -\frac{1}{2}$, $\overline{QR}: -\frac{2}{4} = -\frac{1}{2}$ > opp sides //

$\overline{PQ}: \frac{2}{4} = \frac{1}{2}$, $\overline{SR}: \frac{2}{4} = \frac{1}{2}$ > opp. sides //.

$\boxed{\text{PQRS is Rhombus}}$

Prove rhombus:

Are all 4 sides $\cong$? $\boxed{\text{YES}}$

$\overline{PQ} = 2^2 + 4^2 = x^2$ $\boxed{\sqrt{20}}$

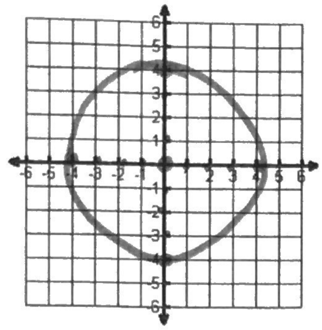
$\overline{QR} = 2^2 + 4^2 = x^2$ $\boxed{\sqrt{20}}$

$\overline{SR} = 2^2 + 4^2 = x^2$ $\boxed{\sqrt{20}}$

$\overline{PS} = 2^2 + 4^2 = x^2$ $\boxed{\sqrt{20}}$

Directions: Graph each circle. State the center and the radius.

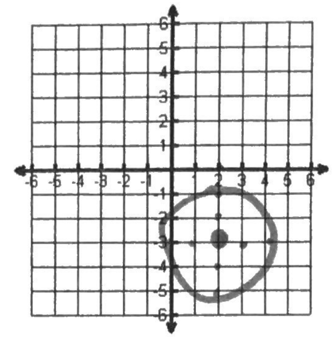
18) $x^2 + y^2 = 16$



Center: (0,0)

Radius: 4

19) $(x-2)^2 + (y+3)^2 = 4$



Center: (2,-3)

Radius: 2

Directions: Write the equation in standard form.

20) The center is (−2, 1) & diameter is 6 units.

$r=3$

$r^2=9$

$\boxed{(x+2)^2+(y-1)^2=9}$

21) General form is $x^2 + y^2 - 3x + 5y = 4$

$x^2-3x+\boxed{9/4} + y^2+5y+\boxed{\frac{25}{4}} = 4+\boxed{9/4}+\boxed{\frac{25}{4}}$

$\left(\frac{-3}{2}\right)^2$ $\left(\frac{5}{2}\right)^2=$

$\boxed{\left(x-\frac{3}{2}\right)^2+\left(y+\frac{5}{2}\right)^2=12.5}$

22) The center is (2, 4) & is tangent to y = 0.

(x axis)

radius: 4

$\boxed{(x-2)^2+(y-4)^2=16}$

23) General form is $3x^2 + 3y^2 = 12x + 21$

3

$x^2+y^2=4x+7$

$-4x \quad -4x$

$x^2-4x+\boxed{4}+y^2=7+\boxed{4}$

$\boxed{(x-2)^2+y^2=11}$

24) Has a diameter with endpoints (3, 0) & (−3, 8)

center: midpoint of diameter

$\left(\frac{3+-3}{2}, \frac{0+8}{2}\right)=(0,4)$

radius: distance of diameter $\div 2$.

$d=\sqrt{(-3-3)^2+(8-0)^2}$

$\sqrt{36+64}$

$\sqrt{100}=10$

$\frac{10}{2}=5$

radius is 5

$\boxed{x^2+(y-4)^2=25}$

25) Area is 16π units^2 and has a center at the origin

$\frac{\pi r^2}{\pi}=\frac{16\pi}{\pi}$

$r^2=16$

$r=4$

center: (0,0)

$\boxed{x^2+y^2=16}$