Math 1
5-2 – 5-4 Review

Name Key

Date

- *I can find the equation of a line parallel to another line through a given coordinate.*
- *I can find the equation of a line perpendicular to another line through a given coordinate.*
- *I can find the distance between two points.*
- *I can find the midpoint of a line segment.*
- *I can determine the area and perimeter of shapes from coordinates.*

State whether the graphs of the following equations are parallel, perpendicular, or neither.

1. $y = 2x + 6$
   $y = 2x - 4$
   parallel both have a slope of 2

2. $2y + 3x = 5 \rightarrow y = -\frac{3}{2}x + \frac{5}{2}$
   $3y - 2x = 5 \rightarrow y = \frac{2}{3}x + \frac{5}{3}$
   perpendicular (opposite reciprocal slopes)

3. $3x - 8y = 11 \rightarrow y = \frac{3}{8}x - \frac{11}{8}$
   $3x - 6y = 10 \rightarrow y = \frac{1}{2}x - \frac{10}{6}$
   neither

4. $\frac{1}{2}x + \frac{1}{3}y = 2 \rightarrow y = -\frac{3}{2}x + 6$
   $2x - 3y = 4 \rightarrow y = \frac{2}{3}x - \frac{4}{3}$
   perpendicular

Find the value of *a* for which the graph of the first equation is perpendicular to the graph of the second equation.

5. $y = ax - 5;\ 2y = 3x$
   $y = \frac{3}{2}x$
   $a = -\frac{2}{3}$

6. $3y + ax = 8;\ y = \frac{3}{4}x + 2$
   $y = \frac{a}{3}x + \frac{8}{3}$
   $a = 4$

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

7. (–5, 8) & (3, 10)

$\frac{-5+3}{2}$ $\frac{8+10}{2}$ $(-1, 9)$

8. (–23, –14) & (42, –9)

$\left(\frac{-23+42}{2}, \frac{-14-9}{2}\right)$ $\left(\frac{19}{2}, \frac{23}{2}\right)$ or $(9.5, -11.5)$

Use the information given to find the missing endpoint of the following line segments.

9. Given one endpoint is (7, –2) and the midpoint is (2, 4):

$\frac{x+7}{2} = 2$ $\frac{y+(-2)}{2} = 4$

$x+7=4$ $y-2=8$

$x=-3$ $y=10$

$(-3, 10)$

10. Given one endpoint is (–15, –4) and the midpoint is (2.5, –8):

$\frac{x-15}{2} = 2.5$ $\frac{y-4}{2} = -8$

$x-15=5$ $y-4=-16$

$x=20$ $y=-12$

$(20, -12)$

Use the information given to find the value of z.

11. The distance between (–12, 9) and (–5, z) is $\sqrt{85}$.

$7^2 + (z-9)^2 = \sqrt{85}^2$

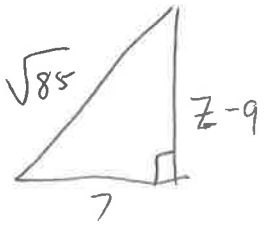
$49 + (z-9)^2 = 85$

$(z-9)^2 = 36$

$z-9 = \pm 6$

$z-9=6$ or $z-9=-6$

$z=15$ or $z=3$



12. The distance between (z, 22) and (–11, –50) is 78.

$(z+11)^2 + 72^2 = 78^2$

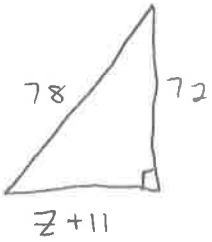
$(z+11)^2 + 5184 = 6084$

$(z+11)^2 = 900$

$z+11 = \pm 30$

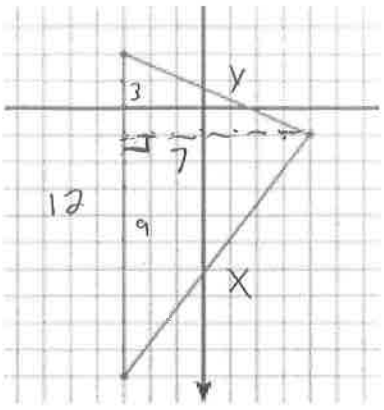
$z+11=30$ or $z+11=-30$

$z=19$ or $z=-41$



Find the area and perimeter of the figures below. Unless told otherwise, assume the *x* and *y*-axis have a scale of one on all given graphs.

13.



$A = \frac{1}{2}(12)(7) =$ 42 units²

$9^2 + 7^2 = x^2$ $\quad 3^2 + 7^2 = y^2$

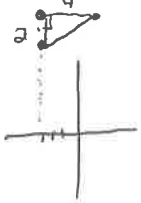
$81 + 49 = x^2$ $\quad 9 + 49 = y^2$

$130 = x^2$ $\quad 58 = y^2$

$11.402 = x$ $\quad 7.616 = y$

$P = 11.402 + 7.616 + 12 =$ 31.018 units

14. A triangle with vertices (–3, 10), (–3, 8), and (1, 10):



$A = \frac{1}{2}(2)(4) =$ 4 units²

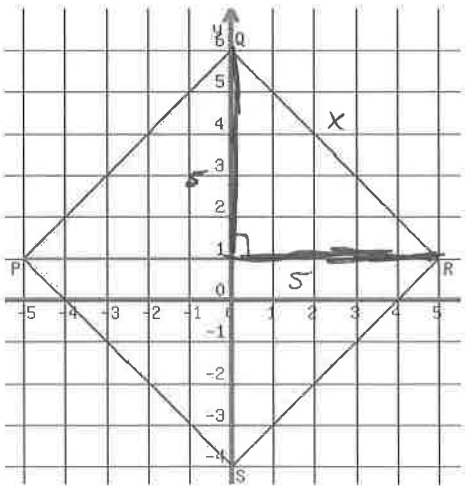
$2^2 + 4^2 = c^2$

$4 + 16 = c^2$

$20 = c^2$ $\quad c = \sqrt{20} = 4.472$

$P = 4.472 + 2 + 4 =$ 10.472 units

15.



$5^2 + 5^2 = x^2$

$25 + 25 = x^2$

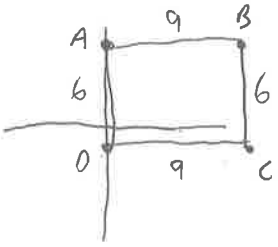
$50 = x^2$

$7.071 = x$

$P = 4(7.071) =$ 28.284 units

$A = 7.071(7.071) =$ 50 units² or 49.999

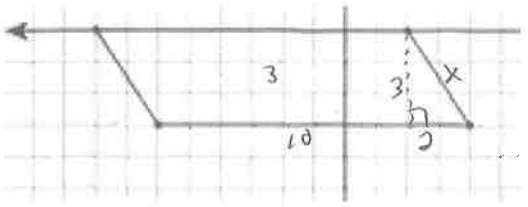
16. Rectangle *ABCD* with vertices *A*(0, 5), *B*(9, 5), *C*(9, –1), and *D*(0, –1).



$P = 6 + 6 + 9 + 9 =$ 30 units

$A = 9 \cdot 6 =$ 54 units²

17.



$A = 10 \cdot 3 = \boxed{30 \text{ units}^2}$

$P = 3.606 + 3.606 + 10 + 10 = \boxed{27.212 \text{ units}}$

$2^2 + 3^2 = x^2$

$4 + 9 = x^2$

$13 = x^2$

$3.606 = x$

18. Parallelogram *WHAT* with vertices $W(0, 2)$, $H(1, 2)$, $A(8, -1)$, and $T(7, -1)$.

$7^2 + 3^2 = x^2$

$49 + 9 = x^2$

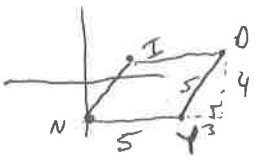
$58 = x^2$

$7.616 = x = HA$

$Perimeter = 1 + 1 + 7.616 + 7.616 = \boxed{17.232 \text{ units}}$

$Area = 1(3) = \boxed{3 \text{ units}^2}$

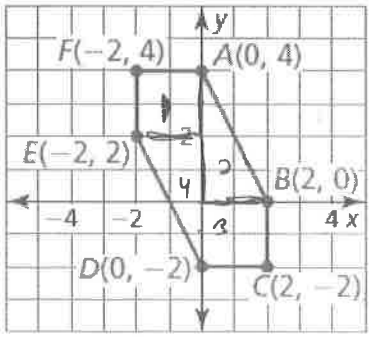
19. Rhombus *NIDY* with vertices $N(0, -3)$, $I(3, 1)$, $D(8, 1)$, $Y(5, -3)$.



$A = 5 \cdot 4 = \boxed{20 \text{ units}^2}$

$P = 4(5) = \boxed{20 \text{ units}}$

20. Find the area of the figure below. You do not need to calculate the perimeter.



Shape 1 $= 2 \cdot 2 = 4 \text{ units}^2$

Shape 2 $= \frac{1}{2} \cdot 2 \cdot 4 = 4 \text{ units}^2$

Shape 3 $= 2 \cdot 2 = 4 \text{ units}^2$

Shape 4 $= \frac{1}{2} \cdot 2 \cdot 4 = 4 \text{ units}^2$

total Area $= 4 \cdot 4 = \boxed{16 \text{ units}^2}$

21. Find the equation of the line through (4, 2) parallel to $y = x + 4$ in both point-slope and slope-intercept form.

$m = 1$

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

$y - 2 = x - 4$

$+2 \quad +2$

$y = x - 2$

22. Find the equation of the line through (4, 2) perpendicular to $y = x + 4$ in both point-slope and slope-intercept form.

$m = -1$

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

$y - 2 = -x + 4$

$+2 \quad +2$

$y = -x + 6$

23. Find the equation of the line through (1, -5) parallel to $y = \frac{1}{8}x + 2$ in both point-slope and slope-intercept form.

$m = \frac{1}{8}$

$y + 5 = \frac{1}{8}(x - 1)$

$y + 5 = \frac{1}{8}x - \frac{1}{8}$

$-5 \quad -5$

$y = \frac{1}{8}x - \frac{41}{8}$

24. Find the equation of the line through (1, -5) perpendicular to $y = \frac{1}{8}x + 2$ in both point-slope and slope-intercept form.

$m = -8$

$y + 5 = -8(x - 1)$

$y + 5 = -8x + 8$

$-5 \quad -5$

$y = -8x + 3$