MODULE 2 Coordinate Proof Using Slope and Distance

LESSON 2-1

Practice and Problem Solving: A/B

1. Yes. Possible answer: The slope of each line is 2. Two non-vertical lines are parallel if and only if they have the same slope.
2. $\frac{3}{2}$
3. $-\frac{1}{5}$
4. $\frac{3}{2}$
5. $-\frac{1}{5}$
6. Yes. Possible answer: It is a parallelogram because it is a quadrilateral with two pairs of parallel sides.
7. 3
8. Possible answer: (1, 0) and (0, –3) are two points on the line.

   $\text{slope} = \frac{0-(-3)}{1-0} = \frac{3}{1} = 3$
9. 3
10. $y = 3x + 7$; Possible answer: Since the slope of line m is 3, its equation has the form $y = 3x + b$. Substitute the coordinates (–2, 1) in the equation for x and y to obtain the result $b = 7$.

LESSON 2-2

Practice and Problem Solving: A/B

1. Yes; Possible answer: The slopes of the lines are –4 and $\frac{1}{4}$. The product of the slopes of the lines is –1. Two non-vertical lines are perpendicular if and only if the product of their slopes is –1.
2. $-\frac{1}{3}$
3. undefined slope (The segment is vertical.)
4. $-\frac{1}{3}$
5. 3
6. No; Possible answer: $\overline{WX}$ and $\overline{YZ}$ are parallel and both are perpendicular to $\overline{ZW}$. However, $\overline{XY}$ is not parallel to $\overline{ZW}$. So, the figure is a trapezoid.
7. $-\frac{3}{2}$
8. Possible answer: (0, 3) and (2, 0) are two points on the line.

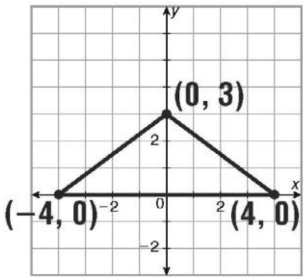
$\text{slope} = \dfrac{3-0}{0-2} = \dfrac{3}{-2} = -\dfrac{3}{2}$

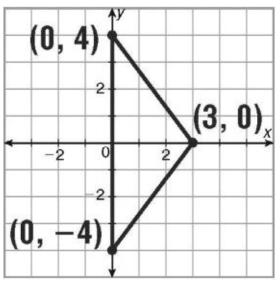
9. $\dfrac{2}{3}$

10. $y = \dfrac{2}{3}x - 3$; Possible answer: The slope, m, is $\dfrac{2}{3}$. The y-intercept, b, is –3. The equation, $y = mx + b$, is $y = \dfrac{2}{3}x - 3$.

LESSON 2-3

Practice and Problem Solving: A/B

1. 

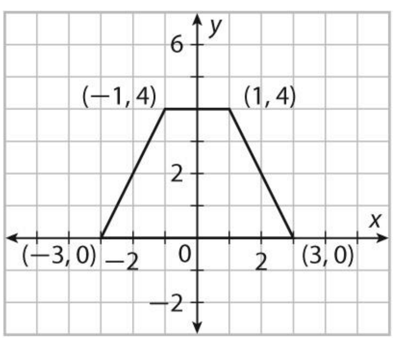
2. 

3. $D(4, 0)$; $E(6, 5)$; $F(2, 5)$
4. $DE = \sqrt{29}$; $DF = \sqrt{29}$
5. You would need to use the coordinates shown and the distance formula to show that the length of $\overline{FE}$ is half the length of $\overline{AB}$.

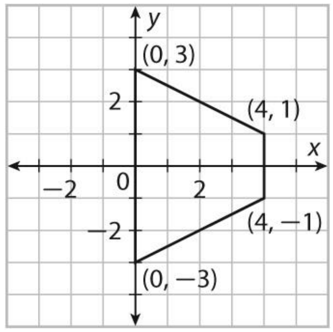
LESSON 2-4

Practice and Problem Solving: A/B

1. Possible answer:



2. Possible answer:



3. Possible answer: Use the slope formula to determine the slope of each side. The top and bottom segments have a slope of 0. The segment on the left has a slope of 4, and the segment on the right has a slope of –4. Since exactly two sides have the same slope, the quadrilateral is a trapezoid.

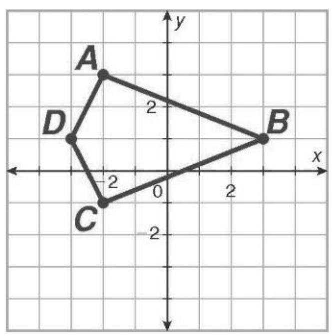
4. Possible answer: *ABCD* is a rectangle with width *AD* and length *DC.* The area of *ABCD* is (AD)(DC) or (4)(6) = 24 square units. By the Midpoint Formula, the coordinates of *E* are $\left(\frac{0+6}{2},\ \frac{0+0}{2}\right)$ = (3,0) and the coordinates of *F* are $\left(\frac{0+0}{2},\ \frac{0+4}{2}\right)$ = (0, 2). The *x*-coordinate of *E* is the length of rectangle *DEGF,* and the *y*-coordinate of *F* is the width. So the area of *DEGF* is (3)(2) = 6 square units.

Since $6 = \frac{1}{4}(24)$, the area of rectangle *DEGF* is one-fourth the area of rectangle *ABCD.*

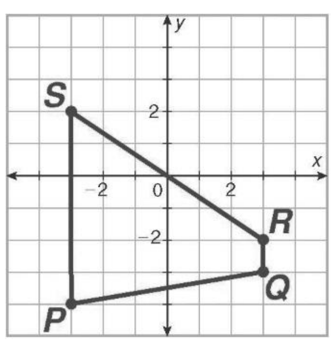
LESSON 2-5

Practice and Problem Solving: A/B

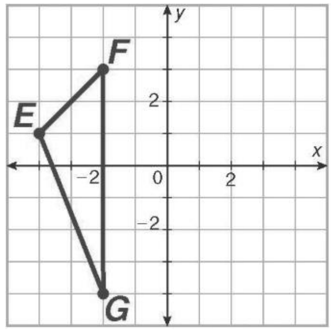
1. kite; $P \approx 15.2$ units; $A = 12$ units^2



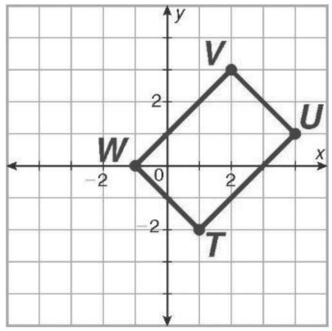
2. trapezoid; $P \approx 20.3$ units; $A = 21$ units^2



3. scalene triangle; $P \approx 15.2$ units; $A = 7$ units^2



4. rectangle; $P \approx 14.1$ units; $A = 12$ units^2



5. $P \approx 23.6$ units; $A = 38$ units^2

6. $P \approx 25.1$ units; $A = 34.5$ units^2