Unit 6 Assessment • Connecting Algebra and Geometry through Coordinates

1. Which equation represents a line that is parallel to the line $y = 4x - 1$?

A. $y = 4x + 2$

B. $y = 2x - 1$

C. $x = 4y - 6$

D. $y = -\frac{1}{4}x + 3$

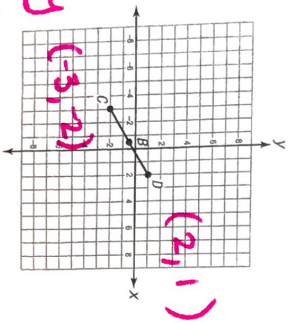*(handwritten: same slope)*

2. Point B is the midpoint of the line segment $\overline{CD}$ below.

(handwritten: $\frac{x+x}{2}, \frac{y+y}{2}$)

(graph with points labeled $(-3, 2)$ and $(2, 1)$)

Which expression should be used to determine the coordinates of point B?

A. $\left(\frac{3+(-2)}{2}, \frac{2+(-1)}{2}\right)$

B. $(2+(-3), 1+(-2))$

C. $\left(\frac{2+(-3)}{2}, \frac{1+(-2)}{2}\right)$

D. $\left(\frac{-3+(-2)}{2}, \frac{2+1}{2}\right)$

3. Which equation represents a line that is perpendicular to the line $y = 6x + 2$?

A. $y = 6x - 3$

B. $y = -6x + 2$

C. $y = \frac{1}{6}x + 2$

D. $y = -\frac{1}{6}x - 1$
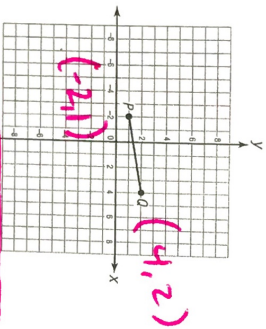
(handwritten: opp. sign & reciprocal)

4. Points $P(-2, 1)$ and $Q(4, 2)$ are the endpoints of the line segment that is graphed below.

(graph with points labeled $(-2, 1)$ and $(4, 2)$)

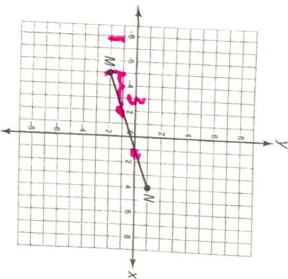*(handwritten: $\sqrt{(x-x)^2+(y-y)^2}$)*

Which expression should be used to determine the length of line segment $\overline{PQ}$?

A. $\sqrt{(4-(-2))^2 + (2-1)^2}$

B. $\sqrt{(4-(-2))^2 - (2-1)^2}$

C. $\sqrt{(4+(-2))^2 + (2+1)^2}$

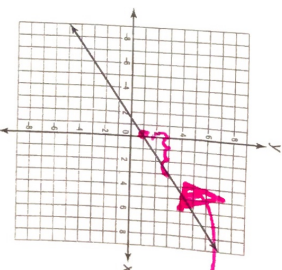D. $\sqrt{(4+(-2))^2 - (2+1)^2}$

5. Points $M(-5, -2)$ and $N(4, 1)$ are the endpoints of the line segment that is graphed below.

(graph)

Which point is $\frac{1}{3}$ of the distance from point M to point N?

A. $(0, -1)$

B. $(-2, -1)$

C. $(-3, 0)$

D. $(1, 0)$

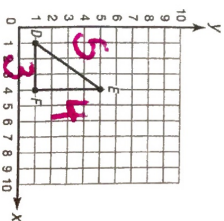**6.** Use the line that is graphed below to answer the question.

(graph, handwritten: slope = 2/3)

Which equation represents a line that is parallel to the line that is graphed above?

A. $y = -\frac{2}{3}x - 4$

B. $y = \frac{3}{2}x + 3$

C. $y = \frac{2}{3}x - 1$

D. $y = -\frac{3}{2}x + 7$

7. Right triangle DEF is graphed on the coordinate plane below.

(graph)

What is the perimeter of $\triangle DEF$?
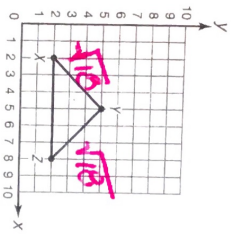
A. 6 units

B. 7 units

C. 12 units

D. 15 units

Go On ▶

8. Triangle XYZ is graphed on the coordinate plane below.

Which of the following proves that the triangle is isosceles?

A. $m\angle YZX = 45°$

B. $\overline{XZ}$ has a length of 6 units.

C. $m\angle XYZ$ is greater than $m\angle ZYX$

D. The distance between X and Y is equal to the distance between Y and Z.

(D circled)

9. Points $A(-2, 9)$ and $B(6, 1)$ are the endpoints of the line segment that is graphed below.
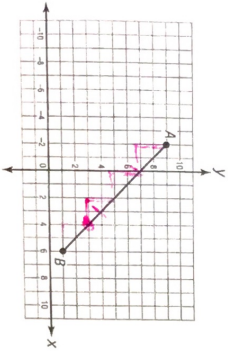
Which point is $\frac{3}{4}$ of the distance from point A to point B?
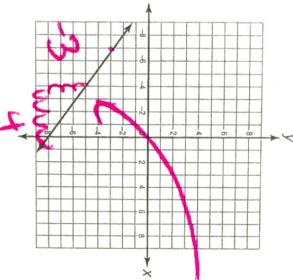
A. (0, 7)

B. (4, 3)

C. (4, 4)

D. (2, 5)

(B circled)

use common sense - which looks closest to 3/4.

10. What is the distance between points $E(-5, -3)$ and $F(2, -7)$?

A. $\sqrt{11}$

B. $\sqrt{29}$

C. $\sqrt{33}$

D. $\sqrt{65}$

(D circled)

$\sqrt{(5-2)^2 + (-3+7)^2}$
$\sqrt{(-7)^2 + (4)^2}$

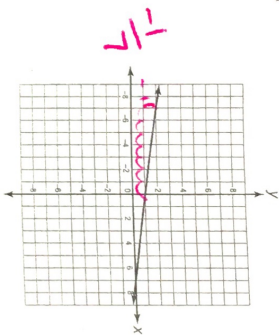**11.** Use the line that is graphed below to answer the question.

Which equation represents a line that is perpendicular to the line that is graphed above?

A. $y = \frac{4}{3}x + 2$

B. $y = \frac{3}{4}x - 8$

C. $y = -\frac{4}{3}x + 7$

D. $y = -\frac{3}{4}x - 2$

(A circled)

Slope = $-\frac{3}{4}$

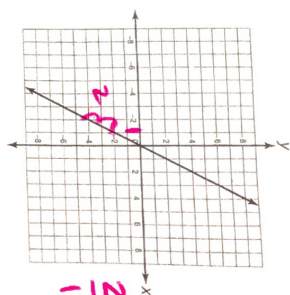**12.** Use the line that is graphed below to answer the question.

Which equation represents a line that passes through the point (7, 4) and is parallel to the line that is graphed above?

A. $y = -\frac{1}{7}x + 3$

B. $y = -\frac{1}{7}x + 5$

C. $y = 7x + 4$

D. $y = 7x - 45$

(B circled)

$-\frac{1}{7}$ ← substitute

[A] $4 = -\frac{1}{7}(7)+3$
$4 = -1 + 3$

[B] $4 = -\frac{1}{7}(7)+5$
$4 = -1 + 5$ ✓

13. Use the line that is graphed below to answer the question.
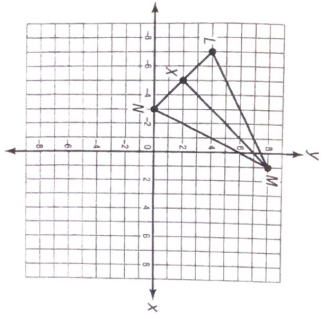

Which equation represents a line that passes through the point (-4, -3) and is perpendicular to the line that is graphed above?

A. $y = 2x + 5$

B. $y = 2x - 3$

C. $y = -\frac{1}{2}x - 5$

D. $y = -\frac{1}{2}x - 1$

(C circled)

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

[C] $-3 = -\frac{1}{2}(4)-5$
$-3 = 2 - 5$ ✓

14. The triangle that is graphed in the coordinate plane is isosceles.


Which sentence proves that $\overline{MX}$ bisects the base of the triangle?

A. $\overline{MX}$ bisects the base because ∠NXM is a right angle.

B. $\overline{MX}$ bisects the base because $m\angle MNL \cong m\angle NLM$.

C. $\overline{MX}$ bisects the base because $LX \cong XN = 4$ units.

D. $\overline{MX}$ bisects the base because $LX \cong XN = \sqrt{8}$ units.

15. Are the lines $y = -4x + 1$ and $y = -\frac{1}{4}x - 3$ parallel, perpendicular, or neither?

A. neither

B. parallel
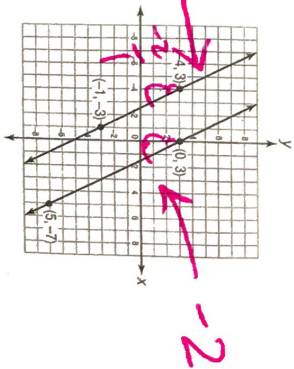
C. perpendicular

D. cannot be determined

---

16. Use the rectangle graphed below to answer the following question.
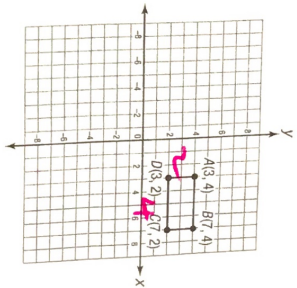
What is the area of rectangle ABCD in square units? Write the formula that you use to calculate the area, and show all your work.

$l \cdot w$ $4 \cdot 2 = 8$

**17.** Two lines are graphed on the coordinate plane below.

Find the slope of each line and explain why the lines are or are not parallel.

-2   -2

slopes are the same so they are parallel

18. A designer was given a blueprint to continue a project that her coworker started. On the blueprint, her partner had drawn the quadrilateral below to represent a table. The designer wants to know if the quadrilateral is a square.
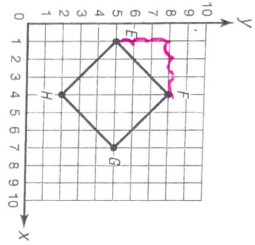
A. Calculate the slopes of $\overline{EF}$, $\overline{FG}$, $\overline{GH}$, and $\overline{HE}$. Show your work.

$EF - 1 \quad GH - 1$

$FG - -1 \quad HE - -1$

B. Calculate the lengths of $\overline{EF}$, $\overline{FG}$, $\overline{GH}$, and $\overline{HE}$. Show your work.

$EF = 3\sqrt{2} \quad GH = 3\sqrt{2}$

$FG = 3\sqrt{2} \quad HE = 3\sqrt{2}$

C. Provide a full explanation, using your answers from parts A and B, of why figure EFGH is or is not a square.

- opp. sides parallel
- consecutive sides perp. (right ∠s)
- all 4 sides equal length

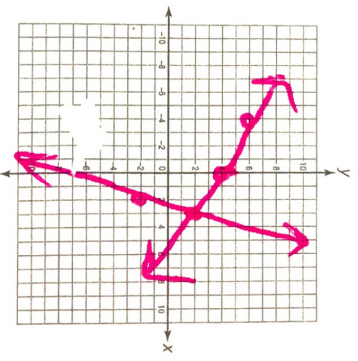It's A SQUARE!

19. Two lines in a plane can be parallel, perpendicular, or intersecting but non-perpendicular.

A. Line one passes through the points $(2, -2)$ and $(3, 2)$. Line two passes through the points $(-4, 6)$ and $(0, 5)$. Determine if the lines are perpendicular. Show your work.

One
$\dfrac{-2-2}{2-3} = \dfrac{-4}{-1} = 4$

Two
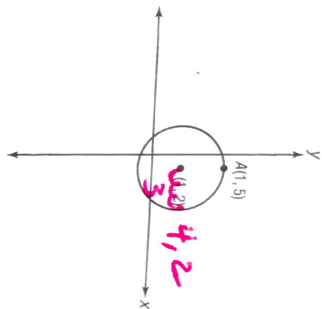$\dfrac{6-5}{-4-0} = \dfrac{1}{-4} = -\dfrac{1}{4}$ Perp!

B. Graph the two lines to check your work.

C. Justify your answer to part A, using the concept of rate of change.

One has a rate of change that is the opposite reciprocal of line two.

20. The circle below has its center at the point (1, 2), and the point A(1, 5) is on the circle.

A. What is the length of the radius of the circle? Show your work.

$$\sqrt{(1-1)^2 + (5-2)^2} = \sqrt{3^2} = \sqrt{9} = \boxed{3}$$

B. Is the point B(4, 2) on the circle? Show your work to justify your answer.

If the radius is 3 and the circle center is at (1,2) then add 3 units to it and the point (4,2) is on the circle

STOP