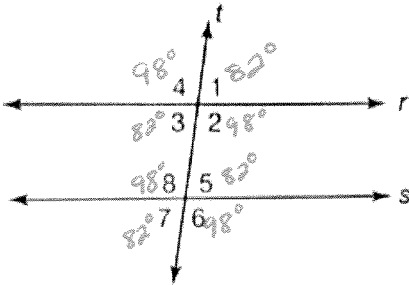


Choose the best answer for each question.

Use the diagram for questions 1 – 3.

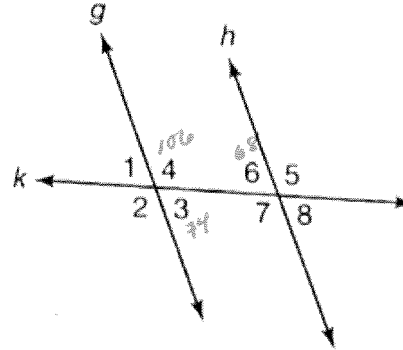
Line  $r$  and line  $s$  are parallel. The measure of  $\angle 1$  is  $82^\circ$ .



- What is the measure of  $\angle 6$ ?
  - $8^\circ$
  - $82^\circ$
  - $98^\circ$
  - $108^\circ$
- Which angles are supplementary?
  - $\angle 1$  and  $\angle 3$
  - $\angle 2$  and  $\angle 3$
  - $\angle 3$  and  $\angle 5$
  - $\angle 4$  and  $\angle 6$
- Which statement is **not** true?
  - $\angle 1$  and  $\angle 4$  are congruent angles.
  - $\angle 3$  and  $\angle 6$  are supplementary angles.
  - The sum of  $m\angle 2$  and  $m\angle 7$  is  $180^\circ$ .
  - $\angle 5$  and  $\angle 8$  form a linear pair.
- Two lines are cut by a transversal. Which of the following is enough to show that the two lines are parallel?
  - Two vertical angles are congruent.
  - Two corresponding angles are supplementary.
  - Two angles for a linear pair.
  - Two alternate interior angles are congruent.

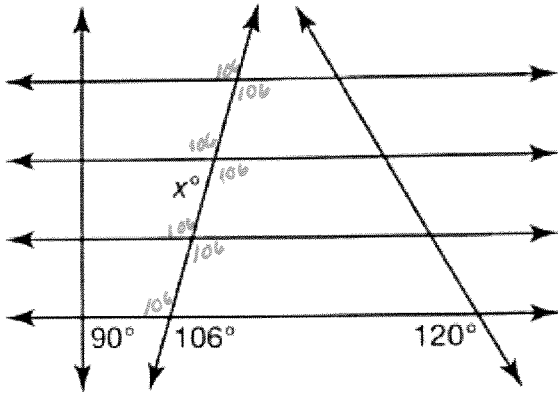
Use the diagram below for questions 5 – 7.

Line  $g$  and line  $h$  are cut by a transversal, line  $k$ .



- If  $m\angle 3 = 74^\circ$ ,  $m\angle 4 = 106^\circ$ , and  $m\angle 6 = 68^\circ$ , which of the following statements must be true?
  - Line  $g$  is parallel to line  $h$ .
  - Line  $g$  is not parallel to line  $h$ .
  - $\angle 3 \cong \angle 8$
  - $\angle 3$  and  $\angle 7$  are supplementary.
- Which of the following statements would be enough information to show that line  $g$  is parallel to line  $h$ ?
  - $m\angle 3 = m\angle 1$
  - $m\angle 3 = m\angle 5$
  - $m\angle 3 = 81^\circ$ ,  $m\angle 5 = 99^\circ$
  - $m\angle 3 = 81^\circ$ ,  $m\angle 4 = 99^\circ$
- If line  $g$  is parallel to line  $h$  and  $m\angle 4 = 112^\circ$ , which of the following must be true?
  - $m\angle 7 = 61^\circ$
  - $m\angle 7 = 78^\circ$
  - $m\angle 7 = 90^\circ$
  - $m\angle 7 = 112^\circ$

8. A fence consists of parallel horizontal wires and slanted wooden fence posts at different angles.



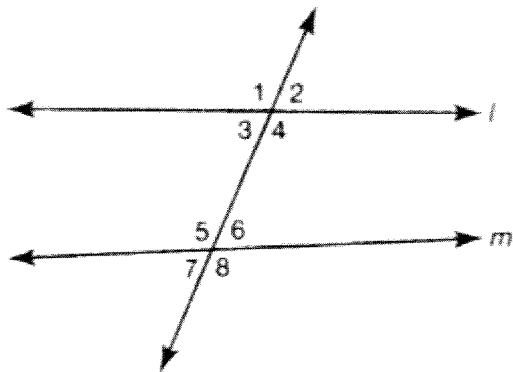
What is the value of  $x$  in the diagram above?

- A.  $60^\circ$   
 B.  $74^\circ$   
 C.  $90^\circ$   
 D.  $106^\circ$

9. Two parallel lines are cut by a transversal. If a pair of same-side interior angles are congruent, what is the measure of each of the two angles?

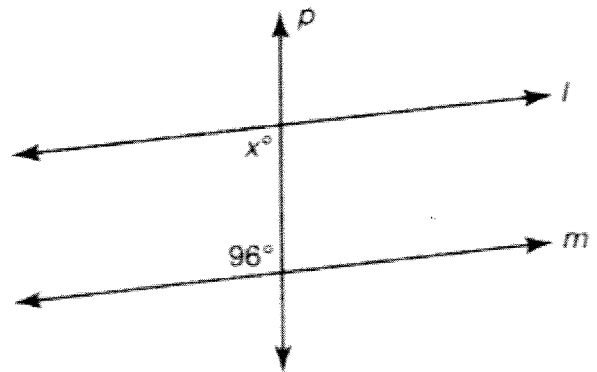
Angle 1 =  $90^\circ$       Angle 2 =  $90^\circ$

10. Which of the following can be used to show that lines  $l$  and  $m$  are **not** parallel to each other?



- A. Show that the sum of the measures of angles 2 and 7 is less than  $180^\circ$ .  
 B. Show that the sum of the measures of angles 3 and 6 is less than  $180^\circ$ .  
 C. Show that the sum of the measures of angles 3 and 7 is less than  $180^\circ$ .  
 D. Show that the sum of the measures of angles 4 and 6 is less than  $180^\circ$ .

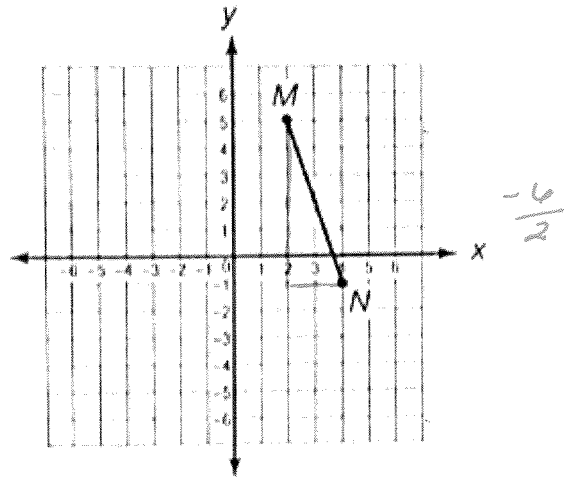
11. Lines  $l$  and  $m$  are intersected by line  $p$ .



For lines  $l$  and  $m$  to be parallel, what must be the value of  $x$ ?

$x =$   $84^\circ$

12. What is the slope of  $\overline{MN}$ ?



- A. -3  
 B. -2  
 C.  $-\frac{2}{3}$   
 D.  $-\frac{3}{2}$

13. What is the slope of a line that passes through  $(9, -8)$  and  $(-3, 12)$ ?

- A.  $-\frac{5}{3}$   
 B.  $-\frac{3}{5}$   
 C.  $\frac{3}{10}$   
 D.  $\frac{10}{3}$
- Handwritten work:  $\frac{y}{x} = \frac{-8 - 12}{9 - (-3)} = \frac{-20}{12} = -\frac{5}{3}$

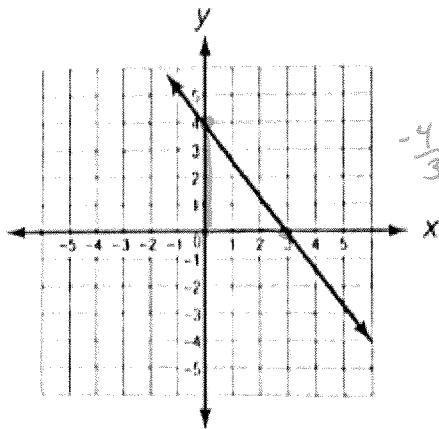
Key

14. What is the slope of a line that is perpendicular to the line whose equation is  $y = -x - 2$ ?

$m = -1$

- A. -1
- B. 0
- C.  $\frac{1}{2}$
- D. 1**

15. Look at the line graphed below.



Which equation represents a line that is parallel to the line shown?

- A.  $y = \frac{4}{3}x + 2$
- B.  $y = -\frac{3}{4}x$
- C.  $y = -\frac{4}{3}x - 3$**
- D.  $y = \frac{3}{4}x - 4$

16. Which equation represents a line that is perpendicular to the line whose equation is  $3x - 5y = 15$ ?

$3x - 5y = 15$   
 $-5y = -3x + 15$   
 $y = \frac{3}{5}x - 3$

- A.  $y = \frac{5}{3}x + 4$
- B.  $y = \frac{3}{5}x + 4$
- C.  $y = -\frac{3}{5}x + 4$
- D.  $y = -\frac{5}{3}x - 4$**

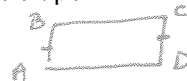
17. Which line segments are parallel?

- I.  $\overline{MN}$  with M(-3, 7) and N(6, -5)
- II.  $\overline{PQ}$  with P(5, -4) and Q(9, -1)
- III.  $\overline{TU}$  with T(-2, -4) and U(-8, 4)

$\frac{-12}{9} = -\frac{4}{3}$   
 $\frac{3}{4}$   
 $\frac{8}{-6} = -\frac{4}{3}$

- A. I and II only
- B. I and III only**
- C. II and III only
- D. I, II, and III

18. If ABCD is a rectangle graphed on the coordinate plane, how does the slope of  $\overline{AB}$  compare to the slope of  $\overline{CD}$ ?



- A. The slope of  $\overline{AB}$  is equal to the slope of  $\overline{CD}$ .**
- B. The slope of  $\overline{AB}$  is the opposite of the slope of  $\overline{CD}$ .
- C. The slope of  $\overline{AB}$  is the reciprocal of the slope of  $\overline{CD}$ .
- D. The slope of  $\overline{AB}$  is the opposite reciprocal of the slope of  $\overline{CD}$ .

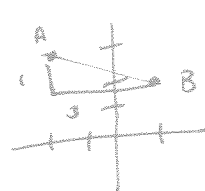
19. Which equation represents a line that intersects  $y = -\frac{1}{4}x - 6$  at exactly one point?

- A.  $4y = -x$   $y = -\frac{1}{4}x$  (Parallel)
- B.  $-y = \frac{1}{4}x - 3$   $y = -\frac{1}{4}x + 3$  (parallel)
- C.  $y = -\frac{2}{8}x + 3$   $y = -\frac{1}{4}x + 3$  (parallel)
- D.  $y = -\frac{3}{9}x + 6$   $y = -\frac{1}{3}x + 6$**

20. Triangle DEF has vertices D(0, 4), E(6, 2), and F(3, -7). Is  $\triangle DEF$  a right triangle? Why or why not?

$m_{DE} = \frac{-2}{6} = -\frac{1}{3}$   
 $m_{EF} = \frac{-9}{-3} = 3$   
 } Negative reciprocal slopes, rt angle.

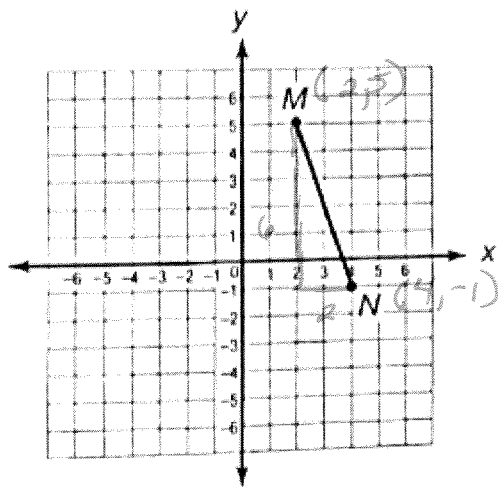
21. What is the length of  $\overline{AB}$  with endpoints A(-2, 3) and B(1, 2)?



$1^2 + 3^2 = c^2$   
 $1 + 9 = c^2$   
 $10 = c^2$

- A.  $\sqrt{2}$  units
- B. 2 units
- C.  $\sqrt{10}$  units**
- D. 10 units

Use the figure below for questions 22 and 23.



22. What is the length of  $\overline{MN}$ ?

- A.  $\sqrt{34}$
- B.  $2\sqrt{10}$
- C. 8
- D.  $6\sqrt{2}$

$$6^2 + 2^2 = c^2$$

$$36 + 4 = c^2$$

$$40 = c^2$$

$$c = \sqrt{40}$$

$$c = 2\sqrt{10}$$

23. What is the midpoint of  $\overline{MN}$ ?

- A. (0.5, 3.5)
- B. (1, 3)
- C. (3, 2)
- D. (3.5, 1.5)

$$(3, 2)$$

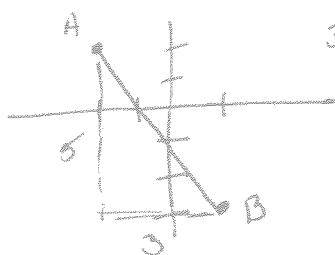
24. Point C is the midpoint of  $\overline{AB}$ . Point D is the midpoint of  $\overline{CB}$ . If  $CD = 4$  units, what is the length of  $\overline{AB}$ ?

- A. 1 unit
- B. 2 units
- C. 8 units
- D. 16 units



25. Point C is the midpoint of  $\overline{AB}$  with endpoints  $A(-2, 2)$  and  $B(1, -3)$ . What is the length of  $\overline{AC}$ ?

- A.  $\frac{\sqrt{2}}{2}$  unit
- B.  $\frac{1}{2}$  unit
- C.  $\frac{\sqrt{34}}{2}$  units
- D.  $\sqrt{34}$  units



$$3^2 + 5^2 = c^2$$

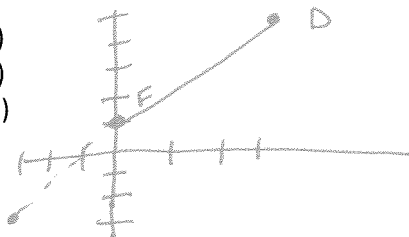
$$9 + 25 = c^2$$

$$34 = c^2$$

$$c = \sqrt{34}$$

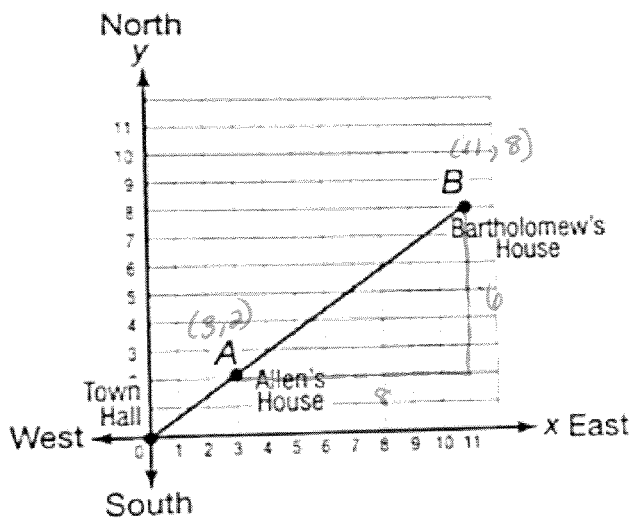
26. Point F is the midpoint of  $\overline{DE}$ . Given  $D(3, 5)$  and  $F(0, 1)$ , what are the coordinates of point E?

- A. (-5, -5)
- B. (-3, -3)
- C. (1.5, 2)
- D. (3, 1)



Use the following information for questions 27 and 28.

On the map below, Town Hall is located at the point (0, 0). Each unit on the grid represents 1 km. Allen lives 3 km east and 2 km north of Town Hall. Bartholomew lives 11 km east and 8 km north of Town Hall.



27. Allen and Bartholomew plan to meet exactly halfway between their houses. What are the coordinates of the location where they should meet?

- A. (5, 7)
- B. (6, 5)
- C. (7, 4)
- D. (7, 5)

28. What is the straight-line distance between Allen's house and Bartholomew's house?

- A.  $\sqrt{10}$  km
- B.  $\sqrt{28}$  km
- C. 10 km
- D. 28 km

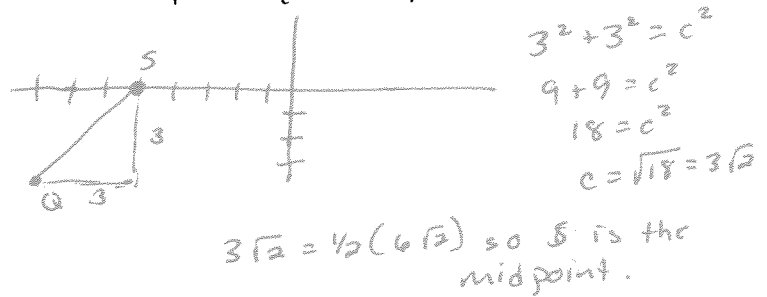
$$6^2 + 8^2 = c^2$$

$$36 + 64 = c^2$$

$$100 = c^2$$

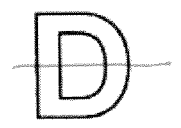
$$c = 10$$

29. Point S lies on segment  $\overline{QR}$ . Point S has coordinates  $(-5, 0)$ , point Q has coordinates  $(-8, -3)$ , and  $QR = 6\sqrt{2}$ . Verify that S is the midpoint of  $\overline{QR}$ . Show your work.



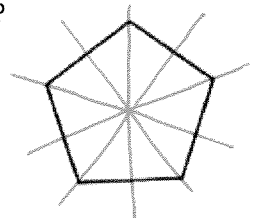
30. How many lines of symmetry does the figure have?

- A. 0
- B. 1
- C. 2
- D. 3



31. How many lines of symmetry does a regular pentagon have?

- A. 2
- B. 3
- C. 4
- D. 5



32. Which of the figures below does **not** have point symmetry?

A.

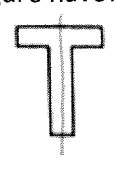
C.

B.

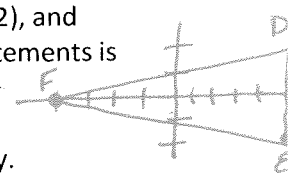
D.

33. What kind of symmetry does the figure have?

- A. Point symmetry and line symmetry
- B. Point symmetry only
- C. Line symmetry only
- D. No symmetry

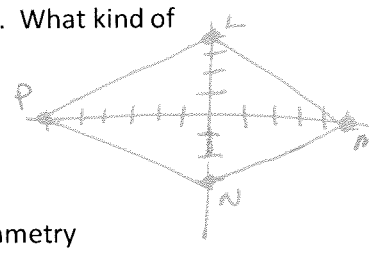


34.  $\triangle DEF$  has coordinates  $D(5, 2)$ ,  $E(5, -2)$ , and  $F(-4, 0)$ . Which of the following statements is true about  $\triangle DEF$ ?



- A. The triangle has 0 lines of symmetry.
- B. Both the x-axis and y-axis are lines of symmetry.
- C. The x-axis is the only line of symmetry.
- D. The y-axis is the only line of symmetry.

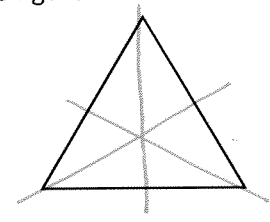
35. Quadrilateral LMNO has coordinates  $L(0, 4)$ ,  $M(5, 0)$ ,  $N(0, -3)$ , and  $P(-6, 0)$ . What kind of symmetry does LMNO have?



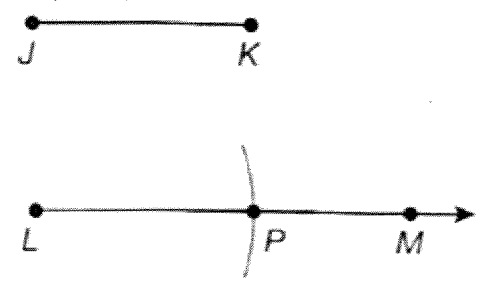
- A. No symmetry
- B. Point symmetry only
- C. Line symmetry only
- D. Point symmetry and line symmetry

36. How many lines of symmetry does the equilateral triangle have? Draw the lines of symmetry on the figure below.

3



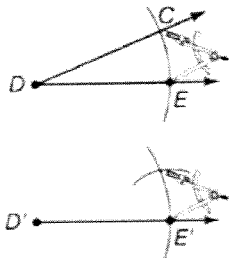
37. Jessica constructed segment LP by setting her compass span to the length of segment JK.



Which statement must be true about this construction?

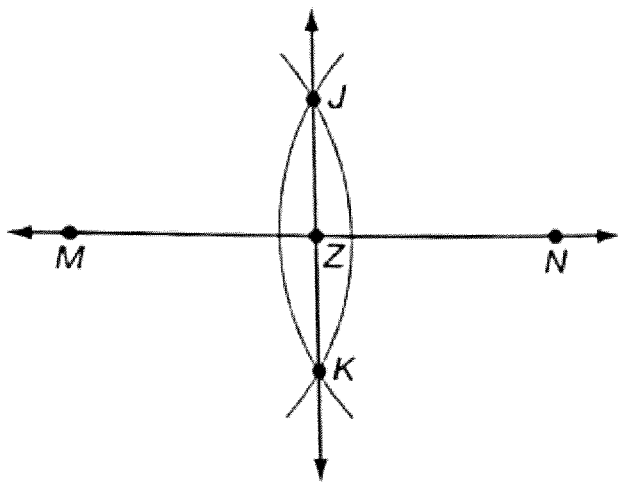
- A. Line segments JK and LP are congruent.
- B. Line segments JK and LM are congruent.
- C. Line segments JK and PM are congruent.
- D. Point P is the midpoint of  $\overline{LM}$ .

38. The diagram below shows two steps in a construction. One step shows the distance between points C and E being measured on  $\angle CDE$  with a compass. The second step shows the same compass span being used to swing an arc from point E'. Which construction is being performed?



- A. Copying a line segment
- B. Drawing the perpendicular bisector of a line segment
- C. Copying an angle
- D. Drawing an angle bisector

Use the diagram for questions 39 and 40.

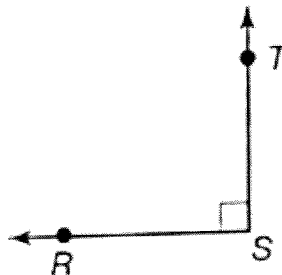


39. Which construction is shown above?
- A. Copying a line segment
  - B. Drawing the bisector of a line segment
  - C. Copying an angle
  - D. Drawing an angle bisector

40. Which statement must be true of the construction shown above?

- A. Point Z is the midpoint of  $\overline{MN}$ .
- B. Point M is the midpoint of  $\overline{MN}$ .
- C.  $\overline{MN}$  is congruent to  $\overline{JK}$ .
- D.  $\overline{MN}$  is congruent to  $\overline{JZ}$ .

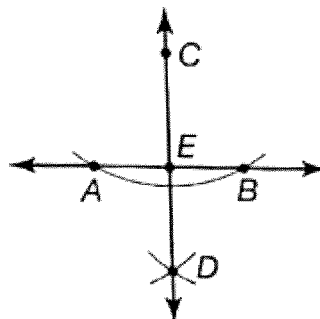
41. Hector is drawing architectural blueprints for a building. In the blueprints,  $\angle RST$  is a right angle representing the corner of a room.



Hector wants to draw a new angle,  $\angle XYZ$ , that measures exactly  $45^\circ$  to use elsewhere in the blueprints. Which of the following constructions should he use?

- A. Copying  $\angle RST$  only
- B. Bisecting  $\overline{ST}$  only
- C. Constructing the perpendicular bisector of  $\overline{ST}$  and then copying  $\overline{ST}$
- D. Constructing the angle bisector of  $\angle RST$  and then copying one of the resulting  $45^\circ$  angles

42. Anoki used a compass and straightedge to construct the figure below.



Which statement is **not** true about the diagram?

- A.  $\overline{AB}$  is congruent to  $\overline{CD}$ .
- B.  $\overline{AE}$  is congruent to  $\overline{BE}$ .
- C.  $\angle AEC$  and  $\angle BEC$  are both right angles.
- D.  $\angle AED$  and  $\angle BED$  are both right angles.