ACTAAP

Arkansas
Comprehensive Testing, Assessment
& Accountability Program

Geometry Spring
End of Course Examination
Released Item Booklet

April 2005 Administration

Arkansas Department of Education

1. Carmen used a grid to draw a map of the area around her school. The school is located at (1, 4) on the grid. The softball field is located at (–1, 7). What is the shortest distance between the school and the softball field?

   A.   1

   * B. $\sqrt{13}$

   C.   5.5

   D.   11

2. The 4 statements below are about 4 capital cities in Africa.

   1. Harare is south of Cairo.
   2. Khartoum is north of Nairobi.
   3. Khartoum is south of Cairo.
   4. Nairobi is north of Harare.

   Which list orders the capital cities from north to south?

   A.   Cairo, Harare, Khartoum, Nairobi
   B.   Cairo, Nairobi, Khartoum, Harare
   * C.   Cairo, Khartoum, Nairobi, Harare
   D.   Cairo, Khartoum, Harare, Nairobi

Use the figure below to answer question 3.
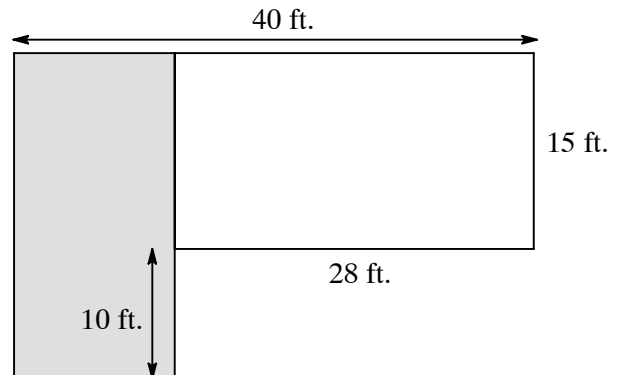
(Not drawn to scale.)

3. Shawn has a greenhouse in the shape shown in the figure above. He keeps new plants in the room represented by the shaded area. What is the perimeter of the room that is shaded?

   * A.   74 ft.
   B.   86 ft.
   C.   93 ft.
   D.   130 ft.

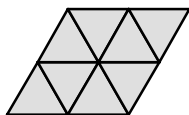**Use the figures below to answer question 4.**

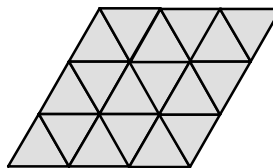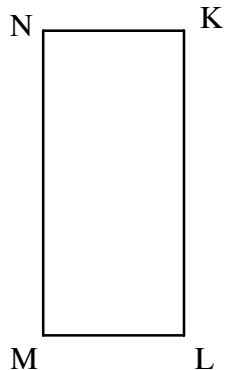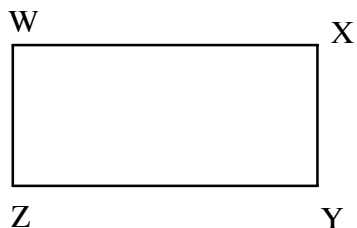| Figure 1 | Figure 2 | Figure 3 |
| 2 triangles | 8 triangles | 18 triangles |

4. How many of the small triangles would be in the **fifth** figure of the pattern?

    A.   25

    B.   36

* C.   50

    D.   72

Use the figures below to answer question 5.

5. Rectangle WXYZ is congruent to rectangle KLMN. Which statement is not always true?

    A. $\overline{WX} \cong \overline{KL}$

* B. $\overline{WZ} \cong \overline{NM}$

    C. $\overline{XY} \cong \overline{LM}$

    D. $\overline{ZY} \cong \overline{NM}$

6. A and B are two different points on a number line. D is the midpoint of $\overline{AB}$. Which is a true statement?

    A.   AB < AD

    B.   AD > BD

    C.   AB = AD

* D.   AD = BD

Use the diagram below to answer question 7.

Wall   25 feet

7 feet

(Not drawn to scale.)
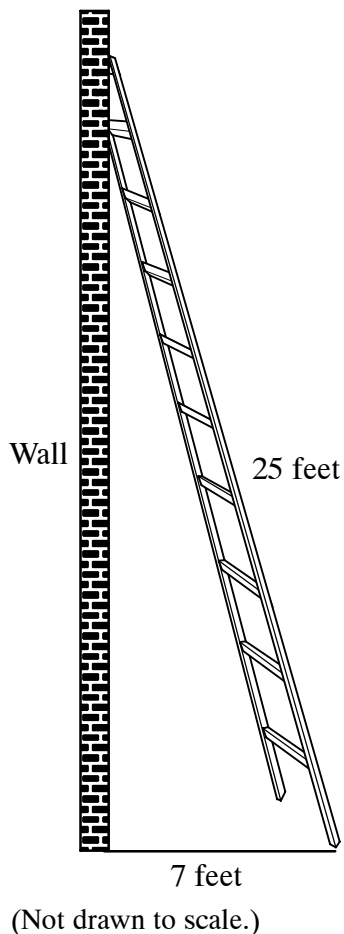
7. A 25-foot rescue ladder rests against a building. The base of the ladder is 7 feet away from the building. How high can the ladder reach on the wall?

  A. $12\frac{1}{2}$ feet

  B.   16 feet

  C.   18 feet

* D.   24 feet

8. What are the coordinates of the center of a circle represented by the equation $(x - 5)^2 + (y + 7)^2 = 16$?

  A.   (-5, -7)

  B.   (-5, 7)

* C.   (5, -7)

  D.   (5, 7)

9. Which mathematical symbol has exactly one line of symmetry?
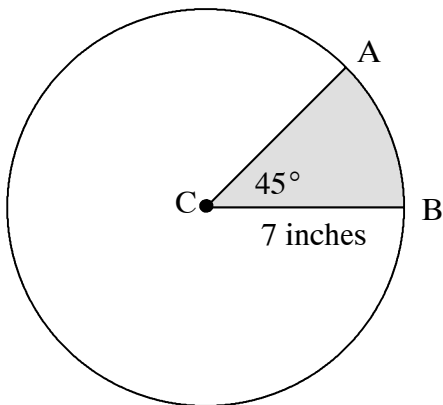
  A. $+$

* B. $\wedge$

  C. $\div$

  D. $\approx$

Use the figure below to answer question 10.

(Not drawn to scale.)

10. The measure of ∠ACB is 45°. The length of $\overline{BC}$ is 7 inches. What is the area of sector ACB, rounded to the nearest tenth?

   * A.   19.2 inches^2
     B.   45.0 inches^2
     C.   153.9 inches^2
     D.   315.0 inches^2

11. Alexis, Bianca, Charlene, and Daphne all have different birthdays in the same month. Their birthdays are on the 13th, 14th, 16th, and 17th.

   • Alexis's birthday is an even number.
   • Bianca's birthday is 2 more than Alexis's birthday.
   • Daphne's birthday is a prime number.
   • Charlene's birthday is a factor of 182.
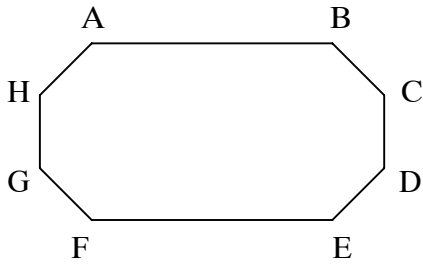
   Which date is Charlene's birthday?

   * A.   13th
     B.   14th
     C.   16th
     D.   17th

12. At 7:00 A.M. in North Dakota, the temperature outside was –10°F. At 2:00 P.M., the temperature was 13°F. How much did the temperature change?

   A.   1.5°F
     B.   3°F
     C.   11.5°F
   * D.   23°F

Use the figure below to answer question 13.

13. What is the sum of the interior angles of the polygon above?

   A.   900°

 * B.   1,080°

   C.   1,260°

   D.   1,440°

14. Theresa is choosing a shape to tessellate a wall for an art project. Which shape will tessellate?

   A.   regular octagon

   B.   regular pentagon

 * C.   regular hexagon

   D.   regular decagon

15. Emily has a square vegetable garden. Each side is 15 feet long. She wants to increase the length of 2 opposite sides by 8 feet. Which will be the perimeter of the new garden?

   A.   44 feet

 * B.   76 feet
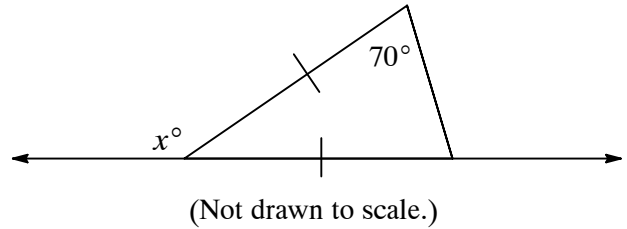
   C.   91 feet

   D.   120 feet

Use the figure below to answer question 16.
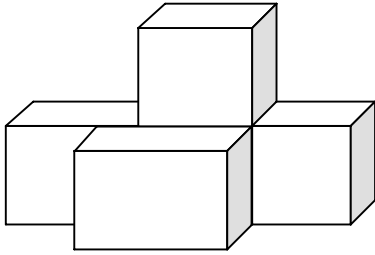
16. The county hospital building is shown in the figure above. What shape would a helicopter pilot see from above?

* A.

B.

C.

D.

Use the figure below to answer question 17.

(Not drawn to scale.)

17. What is x in the figure above?

   A.   40
   B.   70
   C.   110
* D.   140

18. Alicia is increasing the number of laps she can swim. After 2 weeks of practice, she can swim 2 laps. She **doubles** the number of laps she can swim every 2 weeks. How many laps can she swim immediately after her tenth week of practice?

   A.   10
   B.   12
   C.   20
* D.   32

Use the figure below to answer question 19.
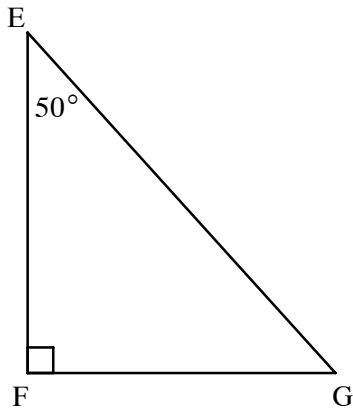
(Not drawn to scale.)

19.   What is tan G?

    A.   0.6428

    B.   0.7660

* C.   0.8391

    D.   1.1918

20.   Stanley needs to purchase a cylindrical corncrib. He wants the radius to be 6 feet. The corncrib should hold 1,700 cubic feet when full. How many feet tall will the corncrib be? Use π = 3.14. (Round to the nearest hundredth.)

  * A.   15.04

    B.   45.12

    C.   90.23

    D.   141.67

Use the chart below to answer question 21.

| Number of Days Elapsed	Quantity of Iodine 131 (grams)
0	2,400
8	1,200
16	600
24	300

21. Iodine 131 is a radioactive substance with a half-life of 8 days. With an initial quantity of 2,400 grams, the chart above shows its decay over a period of days.

By extending the sequence, what is the **total** amount left after 56 days?

A.   9.375 grams

* B.   18.75 grams

C.   37.5 grams

D.   75 grams

22. What is the distance between –4 and 7 on a number line?

A.   -11

B.   -3

C.   3

* D.   11

23. A 6-foot man standing next to a flagpole casts an 8-foot shadow. At the same time, the flagpole casts a shadow of 40 feet. What is the height of the flagpole? (Round to the nearest whole number.)

* A.   30 feet

B.   36 feet

C.   53 feet

D.   64 feet
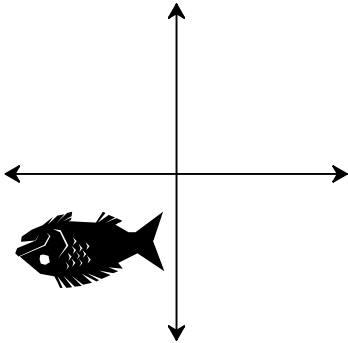
Use the figure below to answer question 24.
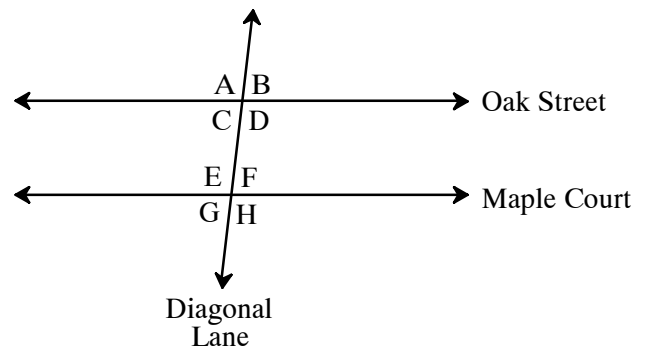
24. Diagonal Lane crosses Maple Court and Oak Street, which are parallel as shown in the figure above. Which intersection angles must be congruent to $\angle A$?

A.   only $\angle C$ and $\angle G$

B.   only $\angle D$ and $\angle H$

C. $\angle C$, $\angle E$, and $\angle G$

* D. $\angle D$, $\angle E$, and $\angle H$
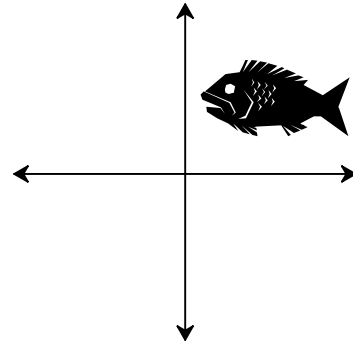
Use the graph below to answer question 25.
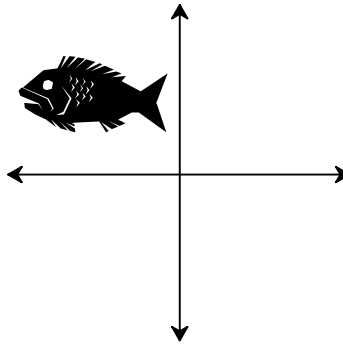
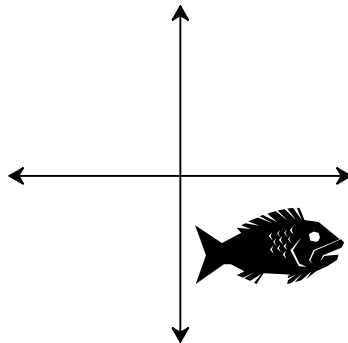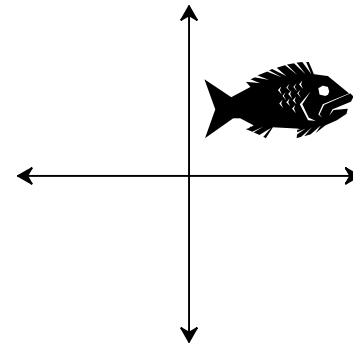**25.** Which graph represents the figure above reflected across the *y*-axis?

A.

B.

C.

* D.

Use the statement below to answer question 26.

All tigers have stripes.

26. If the statement above is true, which is also logically true?

   A.   If an animal has stripes, then it is a tiger.

 * B.   If an animal does not have stripes, then it is not a tiger.

   C.   If an animal has spots, then it could be a tiger.

   D.   If an animal does not have spots, then it is a tiger.

27. The owner of a warehouse is building a rectangular parking area for trucks. The length will be 50 **feet** and the width will be 90 **feet**. The concrete used to build the parking area will be 6 **inches** deep. How many **cubic feet** of concrete will be needed?

   A.   750

   B.   1,125

   C.   1,680

 * D.   2,250

Use the grid below to answer question 28.
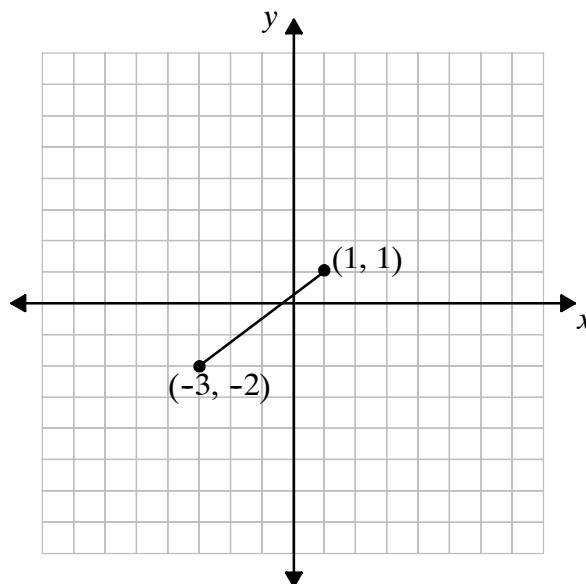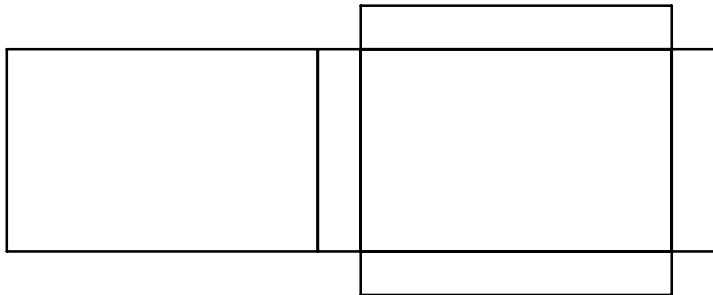

28. What is the shortest distance between the 2 points on the grid above?

   A. $\sqrt{5}$ units

   B. $\sqrt{7}$ units

 * C.   5 units

   D.   7 units

Use the sequence below to answer question 29.

–23, –18, –13, –8, –3, _?_

29. What is the next term in the sequence above?

 * A.   2
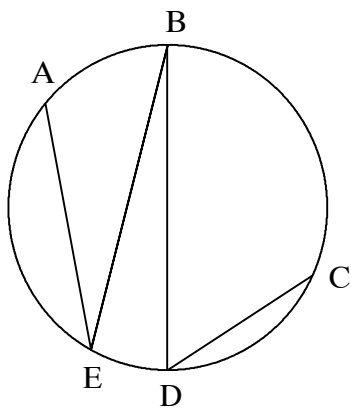
   B.   3

   C.   5

   D.   8

Use the figure below to answer question 30.

30. Which 3-dimensional shape can be formed from the net above?

   A.   cube

   B.   pyramid

* C.   prism

   D.   cylinder

Use the figure below to answer question 31.

(Not drawn to scale.)

31. In the circle above, the measure of
     $\angle\text{AEB} = 24°$ and the measure of $\overset{\frown}{BC}$ is
     114°. What is the measure of $\overset{\frown}{AEC}$?

   A.   48°

   B.   162°

* C.   198°

   D.   222°

Use the figure below to answer question 32.
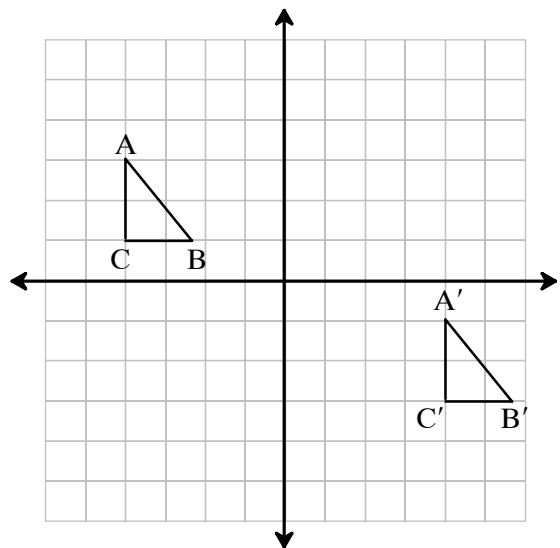
32. The coordinates of C are (−4, 1). Which
     translation moves △ABC to △A′B′C′?

   A.   translate 8 units left, 4 units up

   B.   translate 3 units left, 8 units up

   C.   translate 3 units right, 8 units down

* D.   translate 8 units right, 4 units down

Use the figure below to answer question 33.

A

J   N
          E
(Not drawn to scale.)
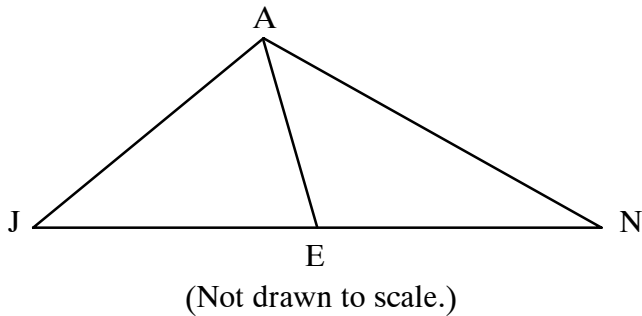
**33.** $\overline{AE}$ is a median in triangle JAN. Which of the following **must** be true?

  A. $\overline{AE} \perp \overline{JN}$
* B. $\overline{JE} \cong \overline{EN}$
  C. $\overline{AJ} \cong \overline{AN}$
  D. $\angle JAE \cong \angle NAE$

Use the table below to answer question 34.

Type of Ball	Circumference	Diameter
soccer	_____ inches	8 inches
basketball	_____ inches	9 inches
golf	_____ inches	2 inches

34. Reese measured the circumference and diameter of several types of athletic balls. She began to record the information in the table shown above but she lost her circumference measurements. How should she determine the measurements that will be placed in the blanks in the table?

  A.   multiply diameter by 6.28
* B.   multiply diameter by 3.14
  C.   divide diameter by 3.14
  D.   divide diameter by 6.28

Use the graph below to answer question 35.
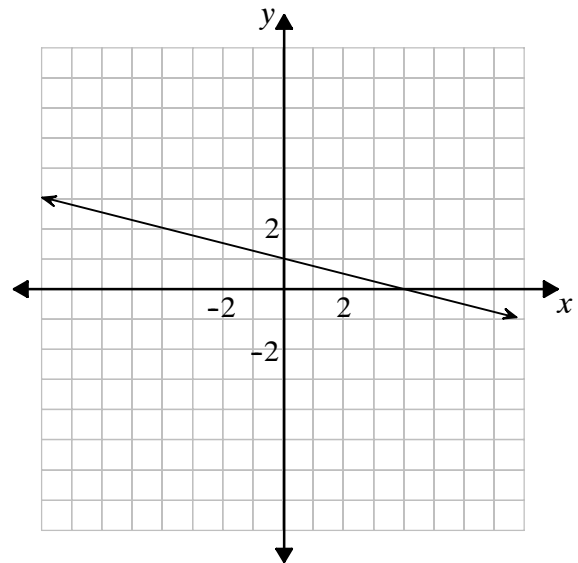
35. Which equation represents the graph above?

* A. $y = -\frac{1}{4}x + 1$

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

  C. $y = \frac{1}{4}x + 1$

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

Use the diagram below to answer question 36.

Track Events

High Jump

100-Meter Race

A

D

B

C
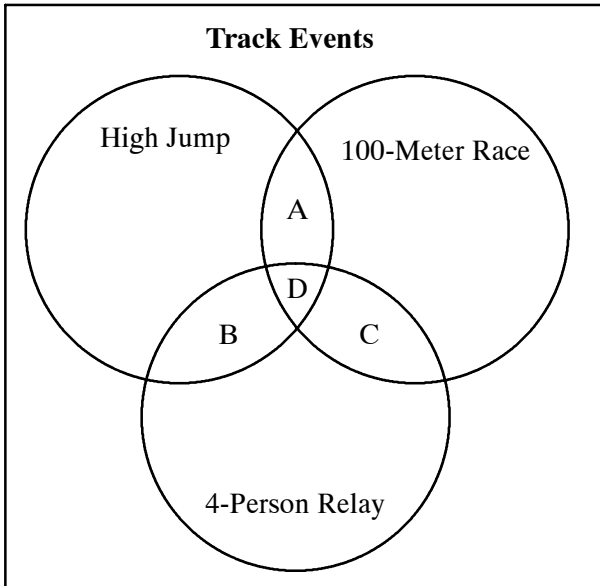
4-Person Relay

36. Marcus is on the track team. He participates in the high jump and the 100-meter race, but does not participate in the 4-person relay. In which section of the diagram above should Marcus be placed?

    * A.   A
      B.   B
      C.   C
      D.   D

Use the figure below to answer question 37.

L_1
A
B
F L_2
L_3
C L_4
E
D
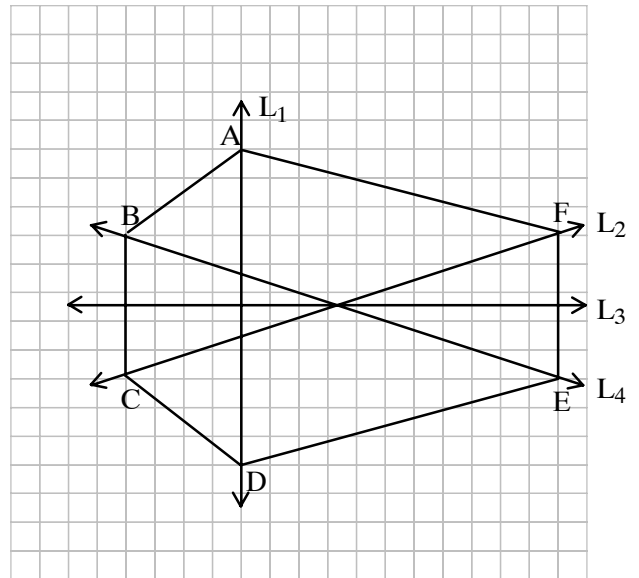
37. What is the line of symmetry of figure ABCDEF?

      A. L_1
      B. L_2
    * C. L_3
      D. L_4

38.   Which is an acute isosceles triangle? (Not drawn to scale.)

A.   6

B.   7   9   8

C.   30°
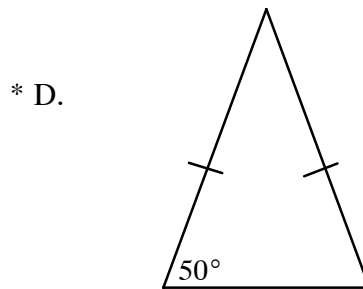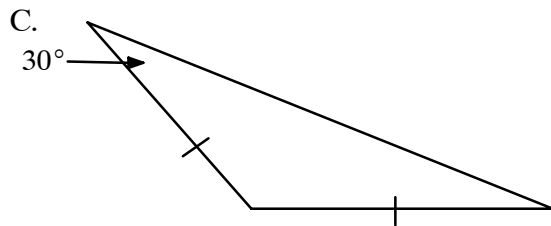
* D.   50°

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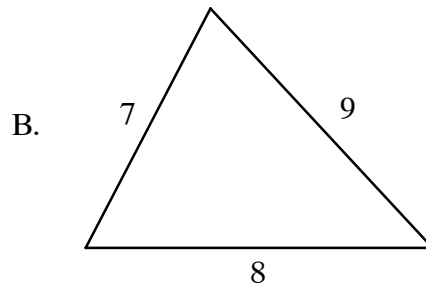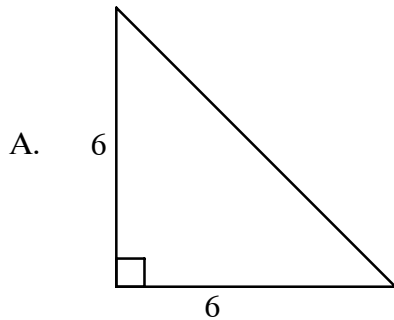
39.   An apartment building enclosed a square area for recycling containers. The length of each side of the square was 6 feet. Next year the square area will be enlarged by increasing the length of each side to 12 feet. How many times greater will the enclosed area be?

  A.   2
* B.   4
  C.   6
  D.   108

Use the figure below to answer question 40.
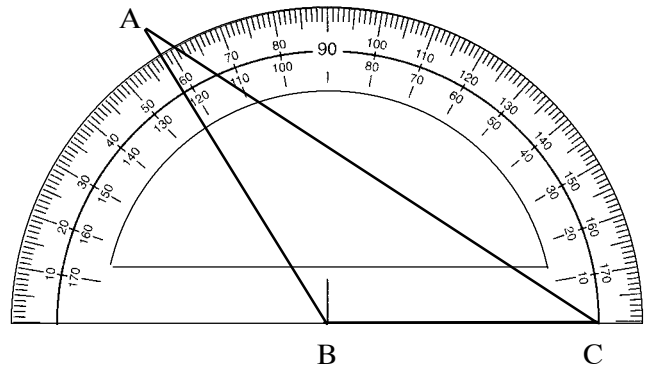
40.   What is the measure of ∠B in △ABC?

  A.   58°
  B.   120°
* C.   122°
  D.   138°

41. Which sequence of sentences is an example of deductive reasoning?

  A. All of Sara's sisters are tall. Takesha is tall. Therefore, Takesha is Sara's sister.

  B. All turtles are reptiles. All turtles are green. Therefore, all reptiles are green.

* C. All cats have fur. Tabby is a cat. Therefore, Tabby has fur.

  D. Bill likes sports. Kevin likes sports. Al likes sports. Therefore, all boys like sports.

Use the figure below to answer question 42.

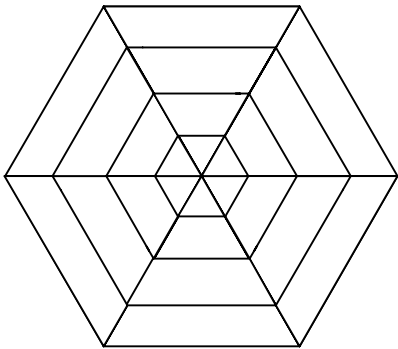**42.** A picnic table has a shape represented by the figure above. Which describes the shape of the table?

* A. hexagon

  B. octagon

  C. pentagon

  D. septagon

43. Estuardo is hanging a picture. He measured the wall's width at 7 feet 4 inches. In order to center the picture, where is the center of the wall?

  A. 37 inches

  B. 38 inches

  C. 43 inches

* D. 44 inches

Use the figure below to answer question 44.

$1\frac{1}{4}$ in.

1 in.

(Not drawn to scale.)
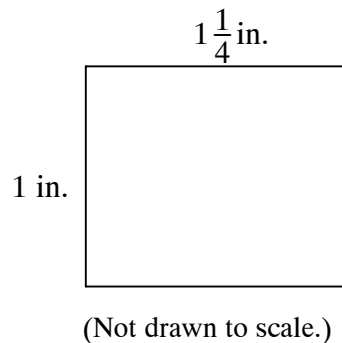
44. Kayla plans to show slides for a program. The slides have a height of 1 in. and a length of $1\frac{1}{4}$ in. as shown above. On the screen, the slide will have a height of 24 in. What will be the **area** of the image on the projection screen?

  A.   30 in.^{2}

  B. 180 in.^{2}

  C. 461 in.^{2}

* D. 720 in.^{2}

Use the figure below to answer question 45.

A
(-5, 9)

C
(-8, 5)

D
(-2, 5)

I

B
(-5, -5)
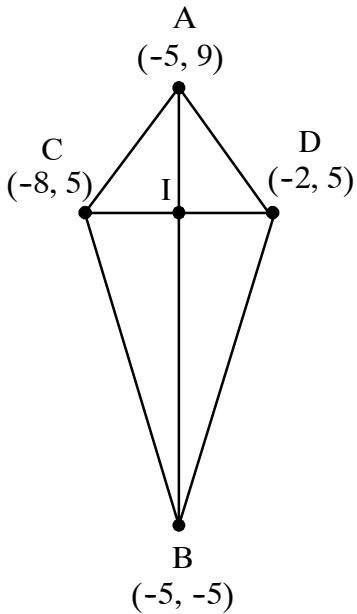
45. A company uses a computer to cut kites from a large roll of material. The computer is guided by the coordinates of the four vertices and the intersection of the diagonals of each kite. What are the coordinates of point I, the intersection of the diagonals, in the diagram shown above?

   A.   (-5, 2)

* B.   (-5, 5)

   C.   (-10, 4)

   D.   (-10, 10)

Use the figure below to answer question 46.
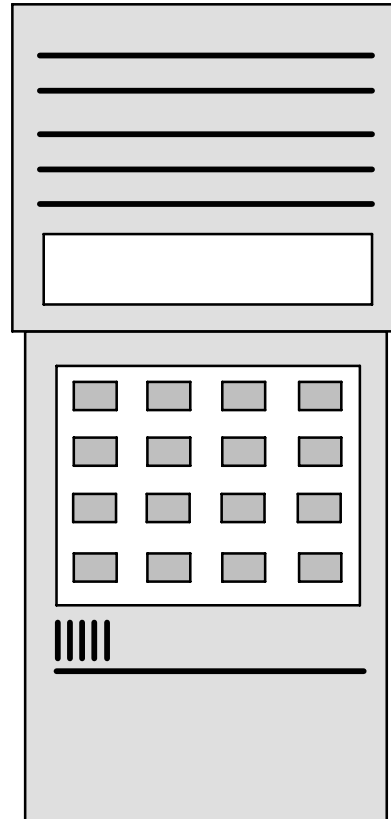
46. What is the height of the walkie-talkie shown above?

* A. $4\frac{1}{4}$ in.

  B. $4\frac{1}{2}$ in.

  C.   11 in.

  D.   12 in.

Use the sequence below to answer question 47.

$$12, 4, \frac{4}{3}, \frac{4}{9}, \underline{\quad?\quad}$$

47. What is the next term in this sequence?

    A. $\frac{4}{81}$

* B. $\frac{4}{27}$

    C. $\frac{4}{12}$

    D. $\frac{12}{9}$

48. Which type of triangle always has exactly 2 congruent sides?

    A.   acute

    B.   scalene

* C.   isosceles

    D.   equilateral

Use the graph below to answer question 49.
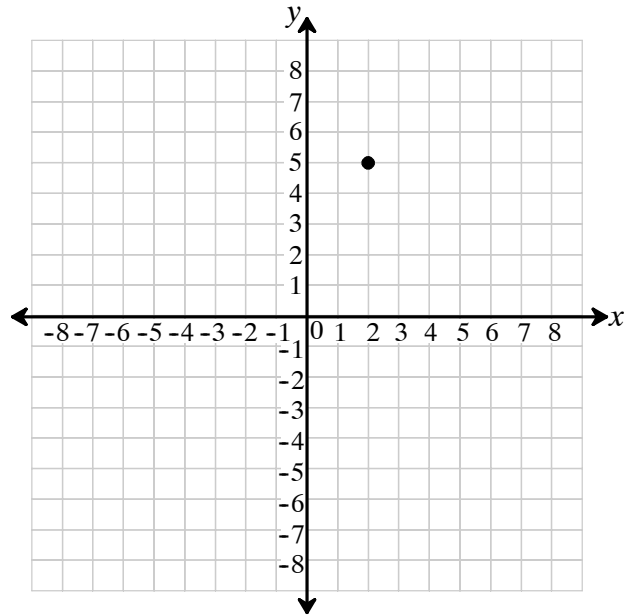
49. The point on the grid is reflected across the y-axis. What are its new coordinates?

    A.   (-5, 2)

* B.   (-2, 5)

    C.   (2, -5)

    D.   (2, 5)

Use the figures below to answer question 50.

(Not drawn to scale.)

50. Which statement is true about the triangles above?

A.   They are isosceles triangles.

B.   They are equilateral triangles.

C.   They have obtuse angles.

* D.   They are congruent triangles.

51. Which statement is a counterexample to the statement, "No mammals live in the ocean"?

A.   A snake is not a mammal.

B.   A dog does not live in the ocean.

* C.   A whale is a mammal and lives in the ocean.
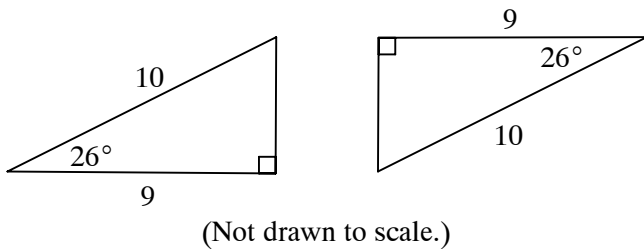
D.   A robin neither lives in the ocean nor is a mammal.

52. Joe's Painting has been hired by Lake City to paint a spherical water tower with a diameter of 62 feet. To determine how much paint needs to be ordered, Joe needs to calculate the surface area of the water tower. What is the surface area of the water tower? Use $\pi = 3.14$. (Round to the nearest whole number.)

A.   3,018 ft.^{2}

* B.   12,070 ft.^{2}

C.   48,281 ft.^{2}

D.   124,725 ft.^{2}

53. The slope-intercept form of a line is $y = 3x - 6$. Which line is **perpendicular** to this line?

* A. $y = -\frac{1}{3}x - 6$

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

C. $y = 3x + 6$

D. $y = -3x - 12$

Use the diagram below to answer question 54.

Band Banner

6 ft.

2 ft.

2 ft.

3 ft.
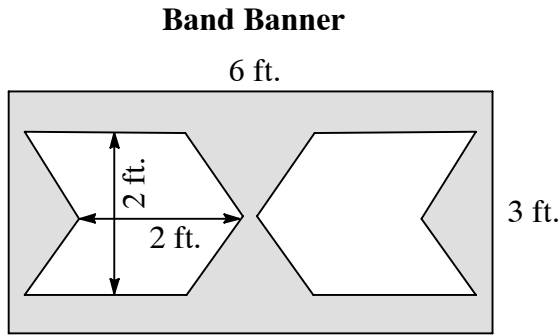
(Not drawn to scale.)

54. The shaded portion of the diagram above represents the banner Tiffany is creating for the school band. The 2 shapes cut out of the banner are identical in size. What is the most reasonable estimate of the area of the banner after the 2 shapes have been cut out?

   A.   8 ft.^{2}

* B.   10 ft.^{2}

   C.   14 ft.^{2}

   D.   18 ft.^{2}

55. Alice, Bob, Colleen, and Dave are in line at a grocery store. Each needs to buy a different item. The items are bread, cereal, milk, and fruit.

1. Bob was second in line, after the person who bought milk but before the person who bought the bread.
2. Colleen did not buy the fruit.
3. Alice bought the cereal.
4. Dave was the first person in line.

Based on the statements, who bought the loaf of bread?

   A.   Alice

   B.   Bob

* C.   Colleen

   D.   Dave

56. John is making special blocks for his patio. Each block is shaped like a rectangular prism and is made from 72 cubic inches of concrete. Each block will have a 6-inch length and a 4-inch width. How many inches thick will each block be?

    A.   1.5 inches

* B.   3.0 inches

    C.   4.5 inches

    D.   7.2 inches

57. The measures of 2 angles are 46° and 44°. These are examples of which type of angles?

    A.   vertical angles

    B.   a linear pair

    C.   supplementary angles

* D.   complementary angles

Use the figure below to answer question 58.
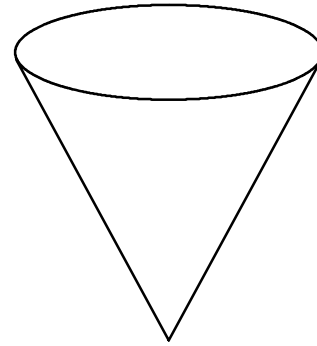
58. The figure above is intersected by a plane **parallel** to the base. What shape could be the cross-section?

* A.   circle

    B.   cone

    C.   cylinder

    D.   triangle

Use the figure below to answer question 59.
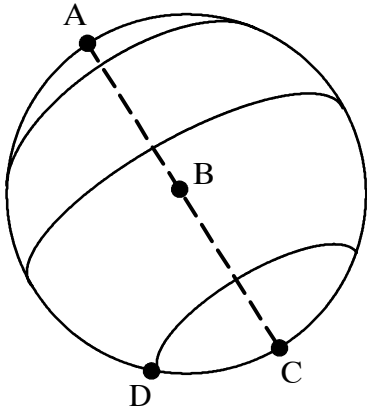
59. The center of the sphere shown above is B. Which is a radius of the sphere?

  * A. $\overline{AB}$

    B. $\overline{AC}$

    C. $\overset{\frown}{AC}$

    D. $\overset{\frown}{AD}$

Use the figure below to answer question 60.
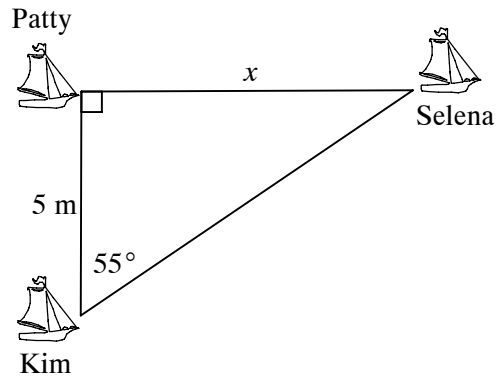
(Not drawn to scale.)

60. In Saturday's toy boat race, Selena appears to be winning. How many meters farther is Selena than Patty? (Round to the nearest tenth.)

    A. 2.9 meters

    B. 3.5 meters

    C. 4.1 meters

  * D. 7.1 meters

CALCULATOR PERMITTED ON ALL ITEMS

GEOMETRY OPEN-RESPONSE ITEM A

A. Adam, Bart, and Carlos each live in a house. The houses are located on 1st Street, 2nd Street, and 3rd Street. Each house is painted a different color: white, green, or yellow.

- The green house is on 1st Street.
- Bart and Carlos live on consecutively numbered streets.
- Adam does not live on 1st Street and does not live in the yellow house.
- Carlos does not live in the green house.

Using the statements above, identify who lives on each street and the color of his house. Show or explain all of your work. You may use a chart or table in your explanation.

GEOMETRY OPEN-RESPONSE ITEM B

B. Stewartville and Rockford are located on a highway. On a grid, the highway forms a straight line. Stewartville is located at (5, 6) and Rockford is located at (11, 2).

1. A third town, Clayton, is on the same highway. The distance between Stewartville and Clayton is the same as the distance between Rockford and Clayton. What are the coordinates of the point at which Clayton is located? Show or explain all of your work even if you use mental math or a calculator.

2. A fourth town, Marshall City, is also located on the grid. Marshall City is not located along the highway. The distance between Stewartville and Marshall City is the same as the distance between Rockford and Marshall City. What are the coordinates of a point at which Marshall City could be located? (Round to the nearest tenth if necessary.) Show or explain all of your work even if you use mental math or a calculator.

BE SURE TO LABEL YOUR RESPONSES (1) AND (2).

GEOMETRY OPEN-RESPONSE ITEM C

tread

rise

(Not drawn to scale.)

10 in.

7 in.

40 in.
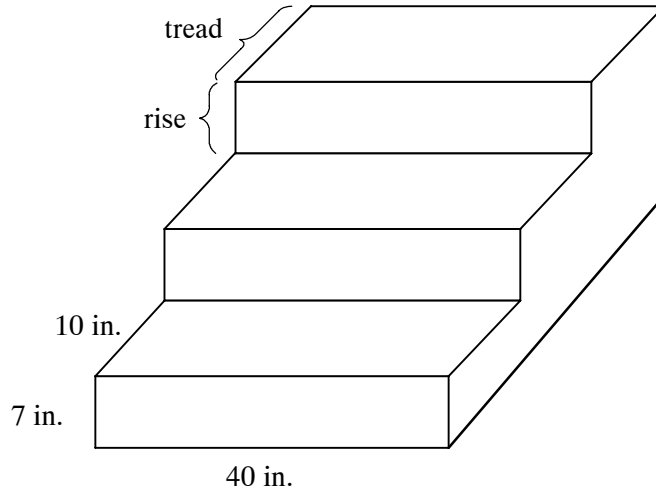
C.   George is building steps as shown in the diagram above. The treads are all the same length and the rises are all the same height. He plans to make the steps out of concrete.

1.   Find the amount of concrete George will need to make the steps. Show or explain all of your work even if you use mental math or a calculator. Include units in your answer.

2.   After the steps are made, George wants to cover the rise and tread of each step with outdoor carpet. Find the area of the carpet George will need to cover the steps. Show or explain all of your work even if you use mental math or a calculator. Include units in your answer.

BE SURE TO LABEL YOUR RESPONSES (1) AND (2).

GEOMETRY OPEN-RESPONSE ITEM E

E. Carol is a school crossing guard standing in front of the school. At 9:00 A.M., the school casts a 40-foot shadow. Carol is 5.5 feet tall and her shadow at 9:00 A.M. is 8.8 feet long.

    1.   Determine the height of the school. Show or explain all of your work even if you use mental math or a calculator. Include units in your answer.

    2.   On some days, Donna helps Carol. Donna is 5.25 feet tall and at 9:00 A.M. she stands completely in the school's shadow. Determine how far away from the school Donna can stand and still be completely in the school's shadow. Show or explain all of your work even if you use mental math or a calculator. Include units in your answer.

BE SURE TO LABEL YOUR RESPONSES (1) AND (2).

GEOMETRY OPEN-RESPONSE ITEM F
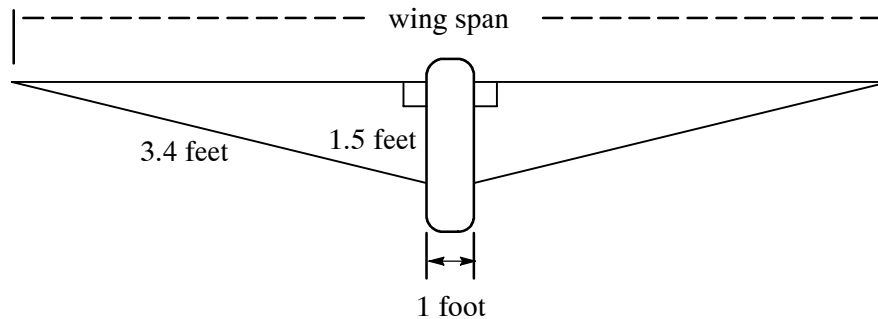
(Not drawn to scale.)

F. Kyle is building a model airplane as shown in the diagram above. The wings are congruent.

1. Determine the length of the wing span of the model airplane. Show or explain all of your work even if you use mental math or a calculator. Include units in your answer. (Round to the nearest hundredth.)

2. Kyle wants to store his airplane in a box. The base of the box is $3\frac{1}{2}$ feet wide by $6\frac{1}{2}$ feet long. Determine whether or not his airplane will fit in the box. Show or explain all of your work even if you use mental math or a calculator. Include units in your answer.

BE SURE TO LABEL YOUR RESPONSES (1) AND (2).