Kansas City Area Teachers of Mathematics
2011 KCATM Math Competition

GEOMETRY AND MEASUREMENT TEST
GRADE 5

INSTRUCTIONS

- **Do not open this booklet** until instructed to do so.

- Time limit: **15 minutes**

- You **may use calculators** on this test.

- Use the π **key** on your calculator **or 3.14159** as the approximation for pi.

- Mark your answer on the Scantron sheet by **FILLING in the oval**.

- You **may not use rulers, protractors, or other measurement devices** on this test.

1. If all sides are congruent in **Figure 1**, what is the best description of the 4-sided figure?
    a) rhombus   c) parallelogram
    b) quadrilateral   d) square
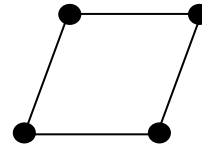   e) not given

Figure 1

2. Which choice best describes **Figure 2**?

    a) pentagon   c) hexagon
    b) octagon   d) heptagon
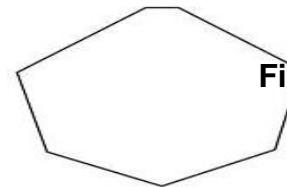   e) not given

Figure 2

Figure 2

3. What is the measure of each angle of an equilateral triangle?
    a) 45°   c) 60°
    b) 30°   d) 90°
    e) not given

4. The net in **Figure 3** shows would form which shape?
    a) pentagonal prism   c) triangular pyramid
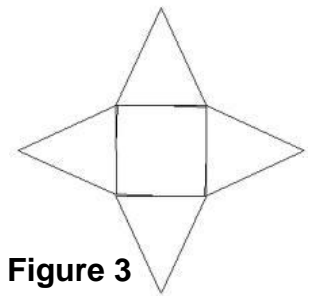   b) cube   d) sphere
    e) not given

Figure 3

_____
For questions #5-7, refer to the coordinate plane shown in **Figure 4**.

5. Which point has the coordinates of (-3,-3)?
    a) A   c) C
    b) B   d) D
    e) not given

6. Joint B,C, and D. What type of triangle is formed?
    a) acute   c) obtuse
    b) right   d) isosceles
    e) not given

7. The point (0, 5) is best described as follows?

    a) Lies on the x- axis   c) Lies on the y-axis
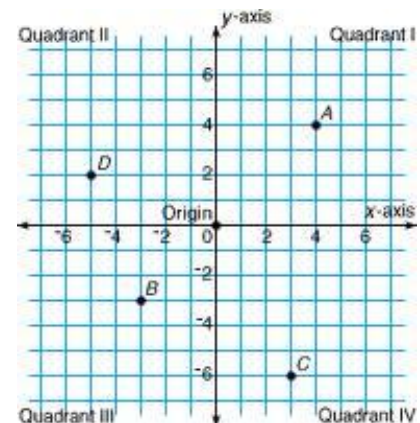   b) Lies in Quadrant 1   d) Lies in Quadrant 3
    e) not given

Figure 4

For questions #8-9, refer to the **Figure 5**. AB = 6 cm. Point B is the center of the circle. Formulas: $C = \pi d$ and $A = \pi r^2$

A
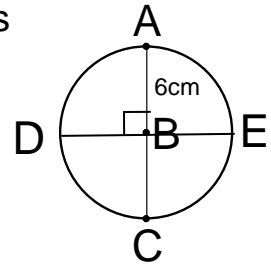
6cm

D B E

C

Figure 5

8.   To the nearest centimeter, what is the length of the circumference of the circle?
   a) 25 cm   c) 38 cm
   b) 19 cm   d) 113 cm
   e) not given

9.   To the nearest tenth of a centimeter, what is the area of one sector (section) of the circle formed by the perpendicular lines $\overline{DB}$ and $\overline{AB}$?
   a) 28.3 sq. cm   c) 9.4 sq. cm
   b) 4.7 sq. cm   d) 12.6 sq. cm
   e) not given

_____

10.   In **Figure 6**, how much larger is the perimeter of triangle 2 than triangle 1?
   a) 12 units   c) 8 units
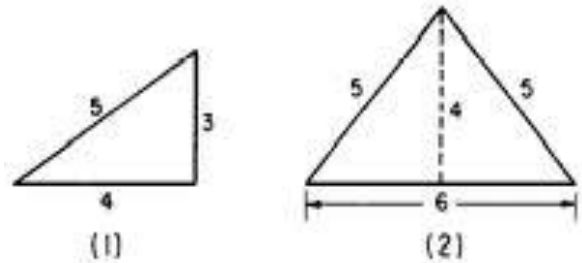   b) 4 units   d) 16 units
   e) not given

5   3

4

(1)

5   4   5

6

(2)

Figure 6

11.   What statement is ALWAYS true?
   a) A rectangle is always a square.
   .
   b) A rhombus is always a square.
   c) A rectangle is always a parallelogram.
   d) A quadrilateral is always a parallelogram.
   e) All statements are always true.

12.   How many edges does the 3-dimensional solid in **Figure 7** have?

   a) 6   c) 13
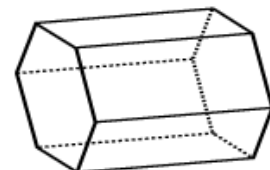   b) 12   d) 18   e) not given

Figure 7

13.   Find the volume of a cube with side length 5".
   a) 15 cubic inches   c) 25 cubic inches
   b) 150 cubic inches   d) 125 cubic inches   e) not given

14. What time will a truck arrive in Lincoln, NE if it leaves Kansas City at
     10:48am and it takes 3 ½ hours to drive there?
     a) 1:16 pm   c) 2:03 pm
     b) 3:28 pm   d) 2:18 pm
     e) not given

Use the **geoboards** in **Figure 8** to answer questions #15 - 19. The vertical
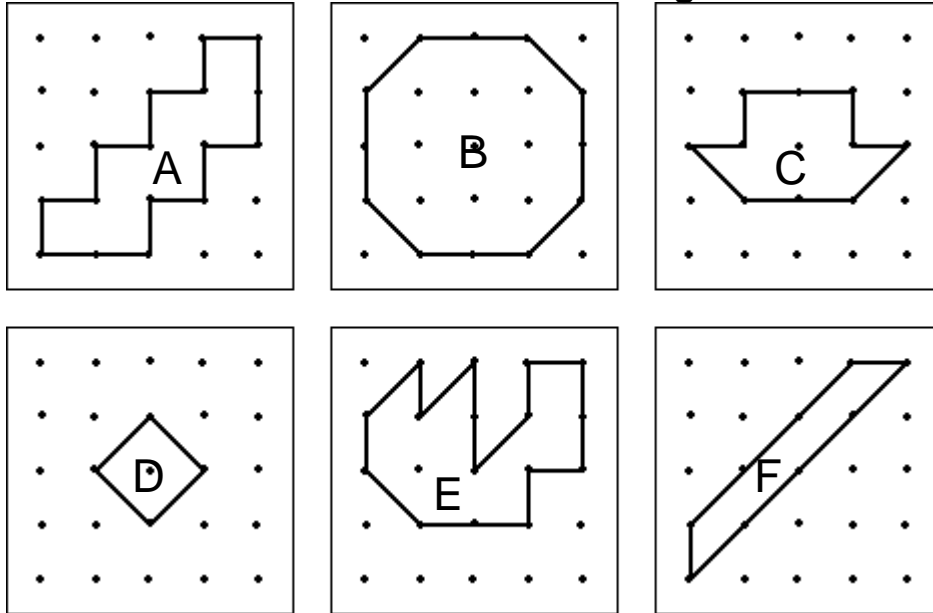and horizontal distance between **each dot on the geoboard is 1 cm**.

Figure 8

15. How many lines of symmetry does shape F have?
     a) 1   c) 3
     b) 2   d) 4   e) not given

16. What is the perimeter of shape A?
     a) 7 cm   c) 16 cm
     b) 14 cm   d) 18 cm   e) not given

17. What is the area of shape C?
     a) 4 sq. cm   c) 6 sq. cm
     b) 5 sq. cm   d) 7 sq. cm   e) not given

18. How much larger in area is shape B than shape E?
     a) 4 sq. cm   c) 8 sq. cm
     b) 6 sq. cm   d) 10 sq. cm   e) not given

19. What is the ratio of the area of shape C to the area of shape D?
     a) 5/2   c) 2/5
     b) 2/1   d) 1/2   e) not given

20. In the tessellation in Figure 9, what is the best description of
     transformation used to tessellate the image?
    a) reflection   c) rotation
    b) translation   d) dilation
    e) not given

Figure 9

21. **Figure 10** shows a parallelogram. Complete the sentence: "The
     opposite angles of a parallelogram are always __."
    a) congruent   c) obtuse
    b) 90°   d) acute
    e) not given

Figure 10

22. Find the area of the composite shape in **Figure 11**.

    a) 48 cm   c) 124 sq. cm
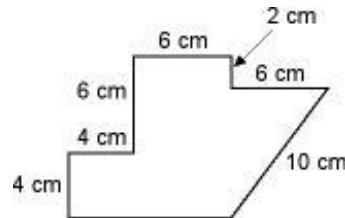   b) 69120 sq. cm   d) 100 sq. cm
    e) not given

Figure 11

2 cm
6 cm
6 cm
6 cm
4 cm
10 cm
4 cm

23. What is a reasonable temperature for a hot summer day in Celsius?
    a) 35° C   c) 100° C
    b) 78° C   d) 90° C   e) not given

24. Which measurement is **NOT** reasonable?
    a) a 5 K race is about a marathon race of 26 miles
    b) a guitar is about 1 meter in length
    c) a small paper clip is about an inch in length
    d) a small car weighs about one ton
    e) all measures are reasonable

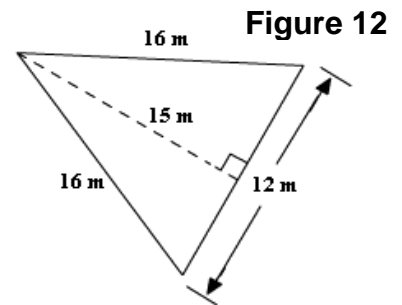25. In a circle, the length from the center to the circle is called what?
    a) chord   c) radius
    b) diameter   d) secant
    e) not given

26. An angle supplementary to a 62° angle is ___.
    a) 62°   c) 38°
    b) 118°   d) 180°   e) not given

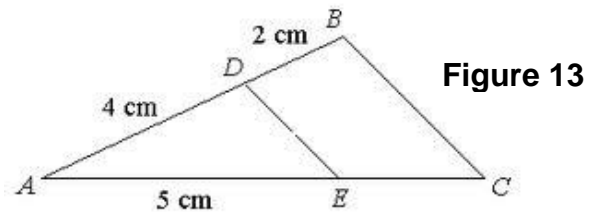27.   Find the area of the triangle in **Figure 12**?
      a) 44 m   c) 44 m^2
      b) 90 m^2 d) 180 m^2
      e) not given

Figure 12

28.   Find EC in **Figure 13**.
      a) 7.5 cm
      b) 2 cm
      c) 2.5 cm
      d) 3 cm
      e) not given

Figure 13

29.   The distance on a map is given by the scale: ½ inch = 30 miles. How
      far is it if the map measures 7 ¾ inches?
      a) 220.2 miles   c) 440.4 miles
      b) 465 miles   d) 232.5 miles
      e) not given

30.   How many pints are there in 4 ½ gallons?
      a) 12 pints   c) 18 pints
      b) 24 pints   d) 34 pints
      e) not given

31.   2,340 grams are how many kilograms?
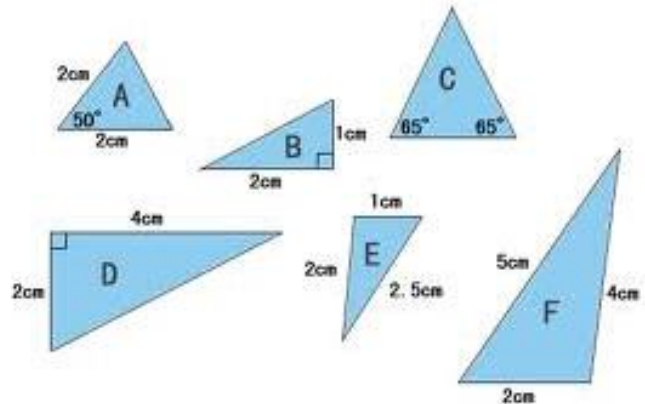   a) 2.340 kg   c) 23.40 kg
      b) 234.0 kg   d) 0.2340 kg
      e) not given

32.   How many centimeters are there in 3.7 m?
      a) 0.37 cm   c) 37 cm
      b) 370 cm   d) 3700 cm
      e) not given

Use **Figure 14** for problems # 33-35.

Figure 14

2cm
A
50°
2cm

B
1cm
2cm

C
65° 65°

4cm
D
2cm

1cm
E
2cm
2.5cm

5cm
F
4cm
2cm

33. Name the acute isosceles triangles.
    a) A and C   b) B and E   c) E and F   d) B, D, and E
    e) not given

34. Find the area of triangle D.

        a) 6 sq. cm   c) 4 sq. cm
        b) 8 sq. cm   d) 3 sq. cm   e) not given

35. Find the measure of the third angle in triangle C.
        a) 40°   c) 50°
        b) 60°   d) 65°   e) not given

36.   How many cement blocks that are 8" by 8" by 16" would it take to make
       one wall of a foundation of a new home if the wall is 20 yards long and
       10 feet high? The blocks will be stacked as in **Figure 15**.

                                                        Figure 15
        a) 1224 cement blocks
        b) 1220 cement blocks
        c) 300 cement blocks
        d) 675 cement blocks
        e) not given

37.   What is the area of the picture frame to the nearest tenth of a square inch if the picture frame is round as in **Figure 16**. The inside diameter is 8" and the outside diameter is 10". The area formula is $A = \pi r^2$

     a) 2.0 sq. in.   c) 50.3 sq. in.
     b) 28.3 sq. in.   d) 10.9 sq. in.   e) not given

Figure 16

38.   In the 1870's the high wheel bicycle **(Figure 17)** was popular. The front wheel was 53-inch in diameter and the back wheel was an 18-inch diameter. To the nearest inch, what is the difference in circumference between the front wheel and the back wheel? The formula is $C = \pi d$.

Figure 17

     a) 110 inches   c) 167 inches
     b) 57 inches   d) 55 inches
     e) not given

39.   Possible nets for cubes are given in **Figure 18**. Which one(s) will **NOT** fold up to make a cube?
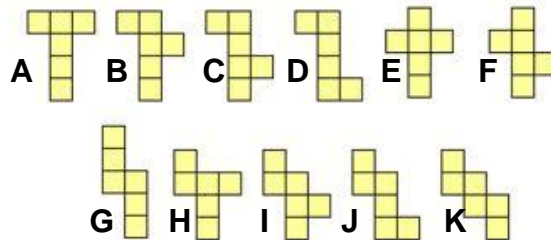
     a) A, B, and D
     b) G, I, and K
     c) J, H, and G
     d) C, D, and F
     e) all create a cube

A   B   C   D   E   F

Figure 18

G   H   I   J   K

40. **Figure 19** shows the 7 tangram shapes. What is the probability of landing on any of the figures 4,5 or 6?

     a) 1/4   c) 1/6
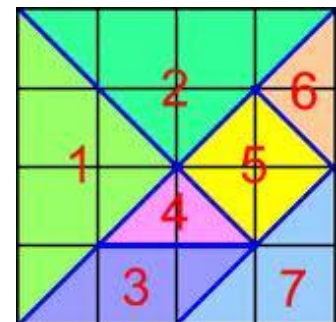   b) 1/8   d) 1/2
     e) not given

Figure 19