Kansas City Area Teachers of Mathematics
2012 KCATM Math Competition

GEOMETRY AND MEASUREMENT TEST
GRADE 6

INSTRUCTIONS

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

- Time limit: **20 minutes**

- You **may use calculators**.

- 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.

- Letter **"E" is "None of the above"**. It is a correct answer for some of the problems.

- Use the π key or 3.14159 on your calculator.

- The pictures in the figures are **"not-to-scale."**

Student Name _____ Student Number _____

School _____

1. Which figures are congruent?

| A. | B. | C. | D. | E. |
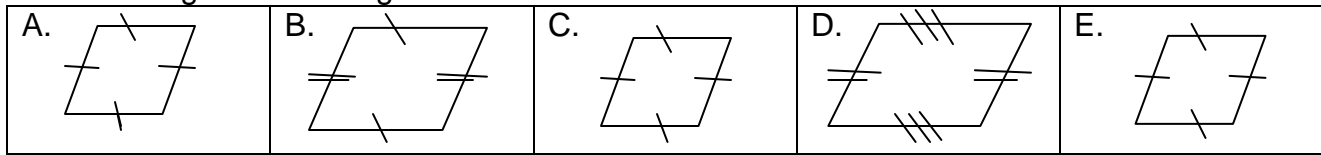
   A.   A and B   B. B and C   C. B and D   D. A, C and E
   E. None of the above

2. What is the definition of a "regular" polygon?
   A. All sides congruent.   B. All sides and all angles congruent.
   C. All angles congruent.   D. Opposite angles are congruent.
   E. None of the above

3. If two angles are supplementary and one of the angles is 76°, what is its supplement?
   A. 14° B. 104° C. 76° D. 24° E. None of the above

4. What is the sum of the angles in a triangle?
   A. 90° B. 360° C. 180° D. 100° E. None of the above
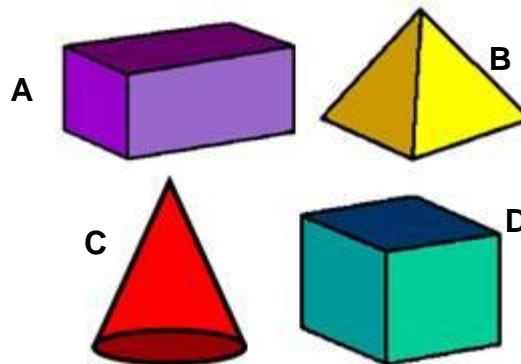
5. What is the sum of the angles in a quadrilateral?
   A. 90° B. 360° C. 180° D. 100° E. None of the above

Use the figures for problems 6-9:

Figures from:
http://hollysresources.global2.vic.edu.au

A

B

C

D

6. Which figure(s) is/are prisms?
    A. B and C   B. B only   C. C only   D. A and D   E. None of the above

7. How many edges does figure in B have?
    A. 5   B. 7   C. 8   D. 4   E. None of the above
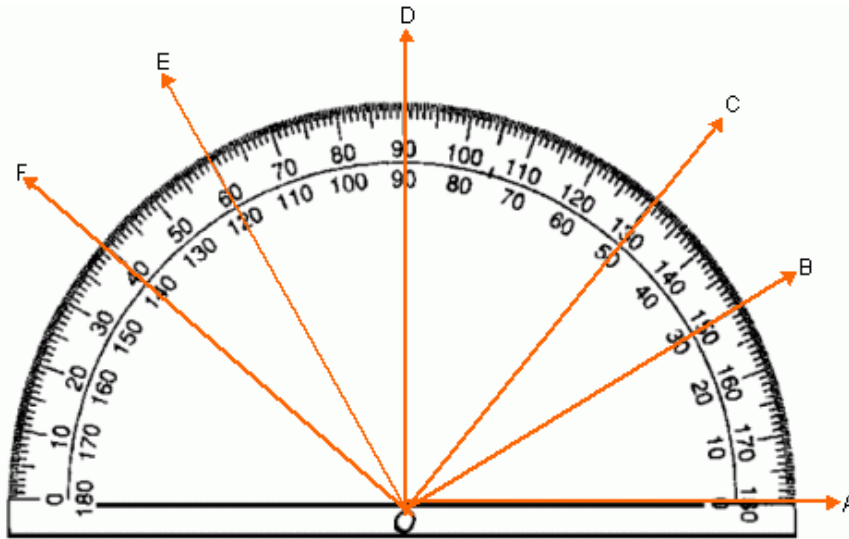
8. How many faces does figure A have?
    A. 3   B. 4   C. 5   D. 6   E. None of the above

9. How many vertices does figure C have?
    A. 1   B. 2   C. 3   D. 4   E. None of the above
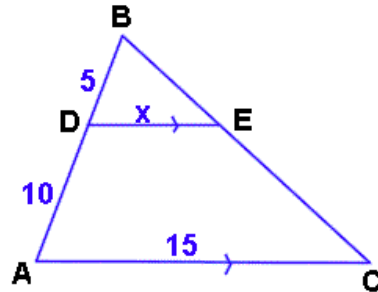
Use the diagram for problems 10-12.   Figure from: http://www.kwiznet.com


10. What type of angle is $\angle FOD$?
     A. Acute   B. Right   C. Obtuse   D. Straight   E. None of the above

11. What is the measure of $\angle EOA$?
     A. 60°   B. 120°   C. 100°   D. 130°   E. None of the above

12. What is the measure of $\angle BOE$?
     A. 30°   B. 60°   C. 90°   D. 120°   E. None of the above

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13. Find the value of x in the similar triangles:

     A.   7.5
     B.   10
     C.   5
     D.   30
     E.   None of the above

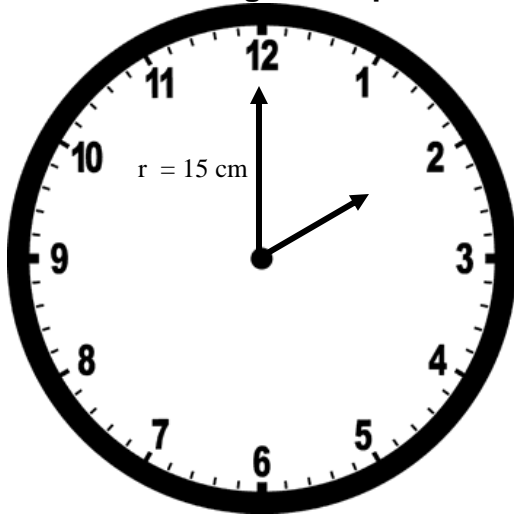

14. Are the following polygons similar? If so, what is the ratio of the small triangle to the large triangle?
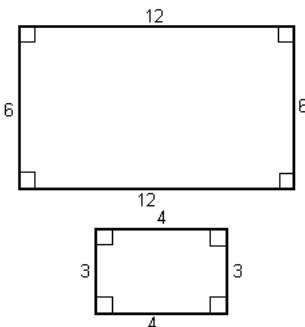
     A.   Not similar
     B.   Yes, ¾
     C.   Yes, ½
     D.   Yes, 1/3
     E.   None of the above
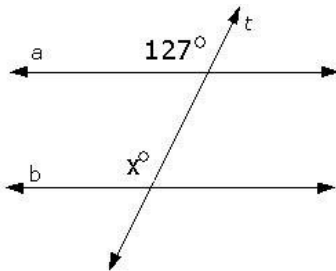
Use the clock figure for problems 15-17. The radius is 15 cm.

r = 15 cm

15. What is the circumference of the clock?
A. 94.25 cm   B. 47.12 cm   C. 706.86 cm
D. 225 cm   E. None of the above

16. What is the area of the clock?
A. 94.25 cm^2 B. 47.12 cm^2 C. 706.86 cm^2
D. 225 cm^2 E. None of the above

17. Given the parallel lines cut by a transversal, what would be the value of x?

127°
a
x°
b

A.   53°   B. 127°   C. 90°   D. 180°
E.   None of the above

18. If you travel 1,000 miles in 18 hours, what is your average rate *(to the nearest whole number)* **Formula: d = rt**   where d = distance, r = rate, t = time in hours.

A. 1800 mph   B. 56 mph   C. 75 mph   D. 70 mph   E. None of the above

Use the figure for problems #19 and #20.

1 cm

1.8 cm

2 cm

0.5 cm

3 cm
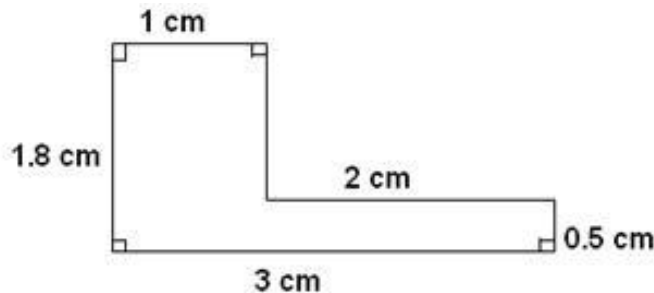
19. What is the perimeter of the composite figure?
A. 8.3 cm   B. 9.6 cm   C. 9.1 cm   D. 8.7 cm   E. None of the above

20. What is the area of the composite figure?
A. 8.3 cm^2 B. 9.6 cm^2 C. 2.8 cm^2 D. 5.4 cm^2 E. None of the above

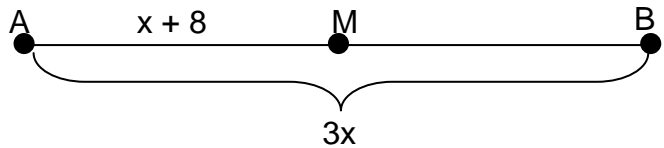21. What is the name of the whole figure below:

A.   Line
B.   Ray
C.   Segment
D.   Plane
E.   None of the above

22. Which of the following shows a pair of complementary angles?

A.	B.	C.	D.	E. None of the above

23. M is the midpoint of $\overline{AB}$. Find AM.

A.   AM = 8
B.   AM = 10
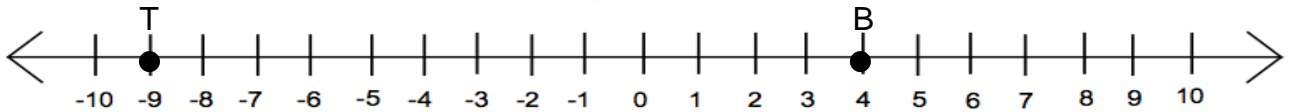C.   AM = 16
D.   AM = 24
E.   None of the above

24. Given $\overrightarrow{RS}$ is on the interior of $\angle ART$. Which statement is true:
   A. AR + RS = AT
   B. AR + RT = ART
   C. $\angle ARS \cong \angle SRT$
   D. $m\angle ARS + m\angle RST = m\angle ART$
   E. None of the above

25. Which figure has 12 sides?
   A. octagon
   B. decagon
   C. dodecagon
   D. heptagon
   E. None of the above

25. Use the number line below to find the length of $\overline{TB}$.

A.   9   B. 14   C. 12   D. 13   E. None of the above
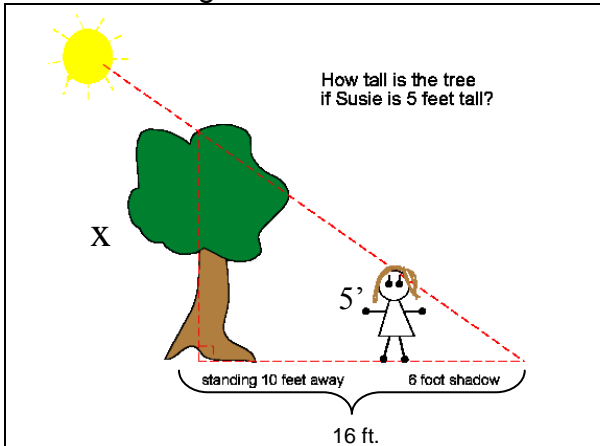
26. The aspect ratio of an HDTV is 9:16, the height compared to the width. If a flat screen TV is 32 inches wide, what would be the height?
   A. 41 in.   B. 18 in.   C. 23 in.   D. 16 in.   E. None of the above

27. If you have a picture that is 4" by 5" and you double each of the sides, how is the area affected by the change?
   A. doubled   B. 3 times as large   C. 4 times as large
   D. same area   E. None of the above

28. What is the height of the tree?

How tall is the tree
if Susie is 5 feet tall?

X

5'

standing 10 feet away   6 foot shadow

16 ft.

A.   8.3 ft.
B.   15.5 ft.
C.   13.3 ft.
D.   38.4 ft.
E.   None of the above

Use the coordinate plane below to answer questions 29.-33.

L   M

O   N

O'   N'

L'   M'

29. Which point has the coordinates of (-5, 1)?
A. O   B. L   C. O'   D. L'
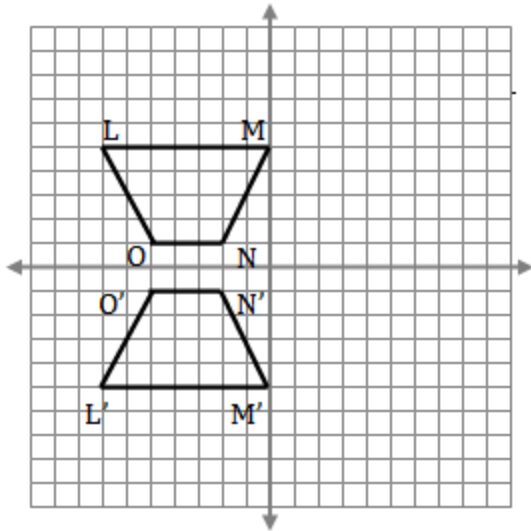E. None of the above

30. The two figures shown are best described as:
A. parallelograms   B. quadrilaterals
C. trapezoids   D. rhombi
E. None of the above

31. What is the slope of $\overline{LM}$?
A. 2   B. 0   C. -2   D. undefined
E. None of the above

32. What is the name of the transformation from LMNO to L'M'N'O'?
A. translation   B. reflection   C. rotation   D. dilation   E. None of the above

33. Find the area of LMNO using the formula: A = ½ h (b$_1$ + b$_2$)
A. 28 sq. units   B. 18 sq. units   C. 20 sq. units   D. 23 sq. units
E. None of the above

34. Put the metric system in the correct order from smallest to largest unit of length:
A. km   hm   dkm   m   dm   cm   mm
B. mm   cm   dm   m   dkm   km   hm
C. dkm   hm   mm   m   km   dm   cm
D. mm   cm   dm   m   dkm   hm   km
E. None of the above

35. To convert 15.3 meters into centimeters, you
   A. multiply by 10   B. multiply by 100   C. divide by 10
   D. divide by 100   E. None of the above

36. Four thousand two hundred twelve centimeters is how many meters?
   A. 4,212 m   B. 42.12 m   C. 4.212 m   D. 0.4212 m
   E. None of the above

37. How many square feet are there in a square yard?
   A. 3 sq. ft.   B. 6 sq. ft.   C. 8 sq. ft.   D. 9 sq. ft.   E. None of the
   above

38. A marathon race is 26 miles. If a kilometer is approximately 0.6 of a mile, how many
   kilometers is the marathon?
   A. 43 km   B. 26 km   C. 52 km   D. 35 km   E. None of the above

39. How many pints are in 6 gallons?
   A. 48 pints   B. 12 pints   C. 24 pints   D. 18 pints   E. None of the above
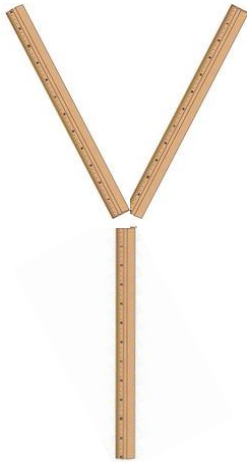
39. Some schools have a bulletin board that forms a Y with rulers *(see diagram on the left)* to help convert yards to feet or feet to yards. If you run 1 mile or 5280 ft, how many yards do you run?

A.   15,840 yds.
B.   1320 yds.
C.   1760 yds.
D.   1680 yds.
E.   None of the above

40. If you need to pour 200 - 8 oz. cups of juice, how many gallons will you need to buy?
   A. 25 gallons   B. 5 gallons   C. 10 gallons   D. 13 gallons
   E. None of the above

Shade the correct answer!

Example: A   ●   C   D   E

Name_____

School _____

1.	A	B	C	D	E	21.	A	B	C	D	E
2.	A	B	C	D	E	22.	A	B	C	D	E
3.	A	B	C	D	E	23.	A	B	C	D	E
4.	A	B	C	D	E	24.	A	B	C	D	E
5.	A	B	C	D	E	25.	A	B	C	D	E
6.	A	B	C	D	E	26.	A	B	C	D	E
7.	A	B	C	D	E	27.	A	B	C	D	E
8.	A	B	C	D	E	28.	A	B	C	D	E
9.	A	B	C	D	E	29.	A	B	C	D	E
10.	A	B	C	D	E	30.	A	B	C	D	E
11.	A	B	C	D	E	31.	A	B	C	D	E
12.	A	B	C	D	E	32.	A	B	C	D	E
13.	A	B	C	D	E	33.	A	B	C	D	E
14.	A	B	C	D	E	34.	A	B	C	D	E
15.	A	B	C	D	E	35.	A	B	C	D	E
16.	A	B	C	D	E	36.	A	B	C	D	E
17.	A	B	C	D	E	37.	A	B	C	D	E
18.	A	B	C	D	E	38.	A	B	C	D	E
19.	A	B	C	D	E	39.	A	B	C	D	E
20.	A	B	C	D	E	40.	A	B	C	D	E

Shade the correct answer!

Example: A   ●   C   D   E

Name_____

School _____

ANSWER KEY

1. A B C ● E
2. A ● C D E
3. A ● C D E
4. A B ● D E
5. A ● C D E
6. A B C ● E
7. A B ● D E
8. A B C ● E
9. ● B C D E
10. ● B C D E
11. A ● C D E
12. A B ● D E
13. A B ● D E
14. ● B C D E
15. ● B C D E
16. A B ● D E
17. A ● C D E
18. A ● C D E
19. A ● C D E
20. A B C D ●

21. A ● C D E
22. ● B C D E
23. A B ● D E
24. A B C ● E
25. A B C ● E
26. A ● C D E
27. A B ● D E
28. A B ● D E
29. ● B C D E
30. A B ● D E
31. A ● C D E
32. A ● C D E
33. A B ● D E
34. A B C ● E
35. A ● C D E
36. A ● C D E
37. A B C ● E
38. ● B C D E
39. A B ● D E
40. A B C ● E