Kansas City Area Teachers of Mathematics
2012 KCATM Math Competition

GEOMETRY
GRADES 7-8

INSTRUCTIONS

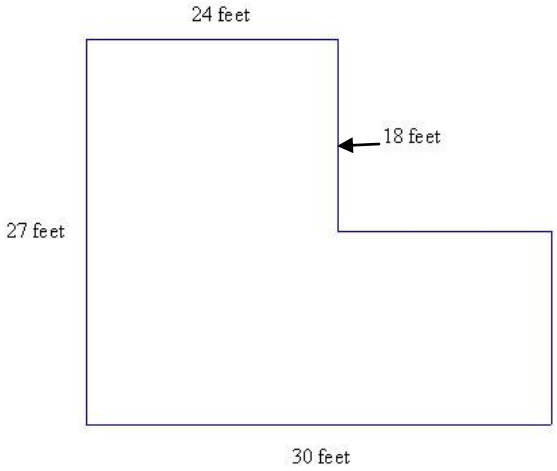
- **Do not open this booklet** until instructed to do so.

- 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 on your calculator.

Student Name _____ Student Number _____

School _____

1. What is the **perimeter** of the following figure?



A. 114 ft.

B. 99 ft.

C. 115 ft.

D. 522 ft.

E. None of the above

2. Find the exact **area a circle** with a diameter of 10 in.
   A. 100π sq. in. B. 400π sq. in. C. 25π sq. in. D. 50π sq. in. E. None of the above

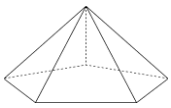
3. What is the perimeter of a **square** with an area of 81 sq. yards?
   A. 18 yds. B. 9 yds. C. 27 yds. D. 36 yds. E. None of the above

4. What is the name of a **7-sided polygon**?
   A. Hexagon B. Pentagon C. Dodecagon D. Heptagon E. None of the above

5. What is the name of the geometric shape that is defined as a parallelogram with **four congruent sides?**
   A. Square B. Rectangle C. Rhombus D. Trapezoid E. None of the above

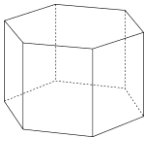
6. If the perimeter of a parallelogram is 60", which of the following dimensions **cannot** be the side lengths?
   A. 14" by 16" B. 15" by 15" C. 10" by 20" D. 12" by 18" E. None of the above

7. How many vertices does a pentagonal pyramid have?



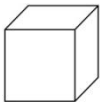
   A. 5 B. 6 C. 7 D. 8 E. None of the above

8. How many faces does a hexagonal prism have?



   A. 6 B. 7 C. 8 D. 10 E. None of the above

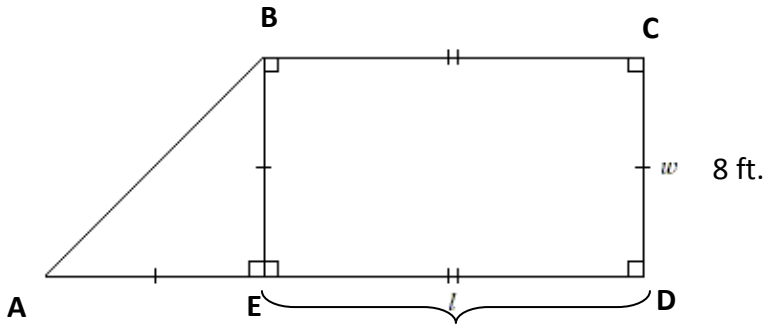
9. How many edges does a cube have?



   A. 4 B. 6 C. 10 D. 12 E. None of the above

10. Which of the following values are **NOT** sides of a right triangle?
    A. 3,4, 5 B. 6,8,10 C. 5, 12, 13 D. 9,12,14 E. None of the above

Use the figure below for problems #11- #14. ***Let w = 8 ft. and l = 12 ft.***



11. What is the degree measure of $\angle A$ in the isosceles right triangle ABE?
A. 30^o B. 45^o C. 60^o D. 90^o E. None of the above

12. Find length AB to the nearest tenth.
A. 11.3 ft. B. 13.9 ft. C. 17.9 ft. D. 12.6 ft. E. None of the above

13. Find the area of triangle ABE in the composite shape.
A. 72 sq. ft. B. 64 sq. ft. C. 32 sq. ft. D. 16 sq. ft. E. None of the above

14. Find the area of the trapezoid ABCD. *Use the formula: $A = \frac{1}{2} h (b_1 + b_2)$*
A. 128 sq. ft. B. 96 sq. ft. C. 160 sq. ft. D. 144 sq. ft. E. None of the above

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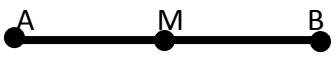
15. Find the **supplement** of an angle measuring 79^o.
A. 11^o B. 101^o C. 281^o D. 151^o E. None of the above

16. If the **angles of a triangle** are: $(x + 15)^o$, $(2x – 3)^o$, and $(3x)^o$, find the value of x.
A. 32 B. 33 C. 28 D. 27 E. None of the above

17. **M is the midpoint** of $\overline{AB}$. If AB = 5x – 18 and AM = 2x, find AB.

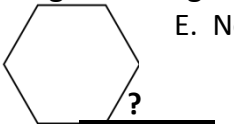


A. 28 B. 72 C. 12 D. 36 E. None of the above

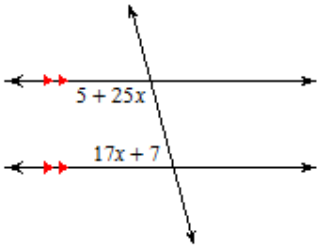
18. What is the **sum of the interior angles** of a **decagon**? *Use the formula: $(n – 2)180^o$*
A. 360^o B. 1080^o C. 1440^o D. 1800^o E. None of the above

19. What is the measure of **one of the interior angles** of a **regular octagon**?
A. 120^o B. 124^o C. 132^o D. 135^o E. None of the above

20. What is the measure of **one of the exterior angles of a regular hexagon**?
A. 60^o B. 70^o C. 80^o D. 120^o E. None of the above

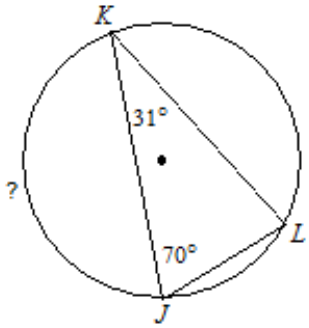


21. **Solve for x**:



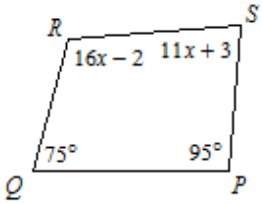
A. 1.5
B. 3.2
C. 4.0
D. 5.1
E. None of the above

22. Find the degree measure of the **minor arc KJ:**



A. 180^{o}
B. 169^{o}
C. 158^{o}
D. 147^{o}
E. None of the above

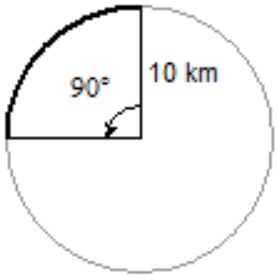
23. Find $m\angle R$



A. 110^{o} B. 94^{o} C. 126^{o} D. 142^{o} E. None of the above

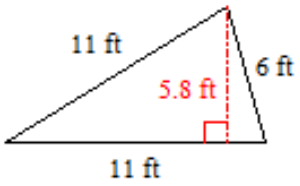
24. Find the **area of a circle** with circumference of 17 ft. Round to the nearest whole number.
A. 26 sq. ft. B. 23 sq. ft. C. 31 sq. ft. D. 32 sq. ft. E. None of the above

25. Find the exact **area of the 90^{o} sector** in the circle.



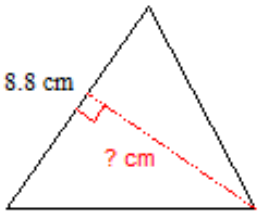
A. 5π sq. km
B. 25π sq. km
C. 100π sq. km
D. 50π sq. km
E. None of the above

26. Find the **area** of the triangle:



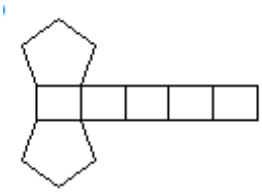
A. 16 ft.^{2}
B. 63.8 ft.^{2}
C. 34.5 ft.^{2}
D. 31.9 ft.^{2}
E. None of the above

27. The area of the triangle is 32.1 cm^2. Find the **height** of the triangle to the nearest tenth.



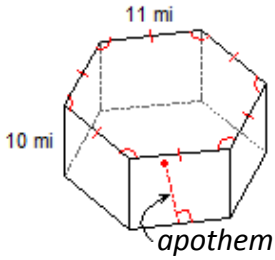
A. 4.7 cm
B. 8.8 cm
C. 5.1 cm
D. 7.3 cm
E. None of the above

28. **Name the figure** formed by the net:



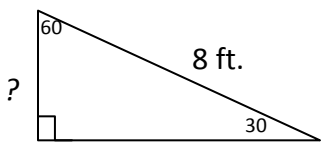
A. Pentagonal prism
B. Triangular pyramid
C. Pentagonal pyramid
D. Rectangular prism
E. None of the above

29. Find the **Lateral Area** *(area of the sides)* of the hexagonal prism.

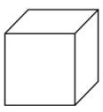


A. 978 sq. mi.
B. 660 sq. mi.
C. 525 sq. mi.
D. 541 sq. mi.
E. None of the above

30. Given the hypotenuse value, find the **short leg** of the 30-60-90 triangle:

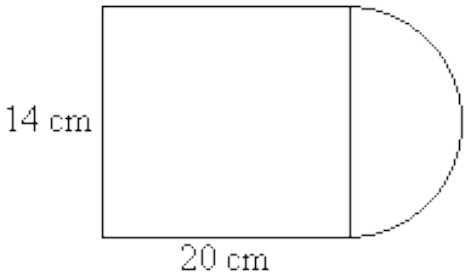


A. $4\sqrt{2}$
B. $4\sqrt{3}$
C. 4
D. 6
E. None of the above

31. Find the **volume** of a cube with sides 7 in. 

A. 49 sq. in. B. 49 cu. in. C. 343 cu. in. D. 21 cu. in. E. None of the above

32. Find the **area of the composite figure**. Round to the nearest hundredth.



A. 356.97 sq. cm
B. 587.88 sq. cm
C. 323.98 sq. cm
D. 647.96 sq. cm
E. None of the above

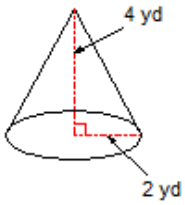
33. Kansas and Missouri have great college basketball teams! Find the **volume of a men's basketball with a 10" diameter** to the nearest tenth.

Use the volume formula for a sphere: $V = \frac{4}{3}\pi r^3$.

A. 498.5 cu. in.
B. 104.7 cu. in.
C. 418.9 cu. in.
D. 523.6 cu. in.
E. None of the above

Find the volume of the following solids in #34-#36. Round to the given place.

34. **Cone:**

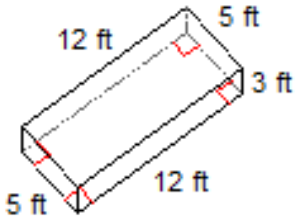


A. 9.42 yd.^{2}
B. 16.76 yd.^{2}
C. 12.83 yd.^{2}
D. 23.05 yd.^{2}
E. None of the above

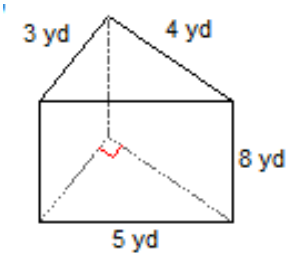
Volume formula: V = 1/3 Bh B = area of the Base, h = height

35. **Rectangular Prism:**

A. 182 ft.^{3}
B. 180 ft.^{3}
C. 140 ft.^{3}
D. 190 ft.^{3}
E. None of the above



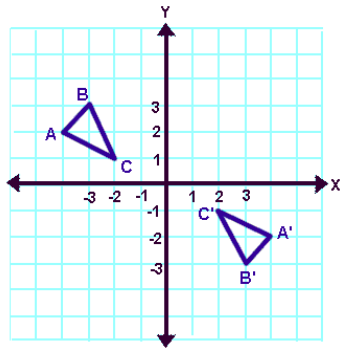
36. **Triangular Prism:**



A. 48 yd.^{3}
B. 67 yd.^{3}
C. 71 yd.^{3}
D. 33 yd.^{3}
E. None of the above

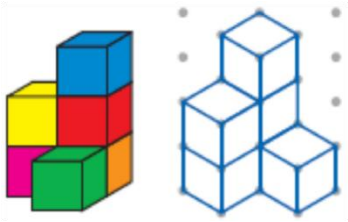
Volume formula: V = Bh B = area of the Base, h =height

37. Name the **transformation** graphed below:



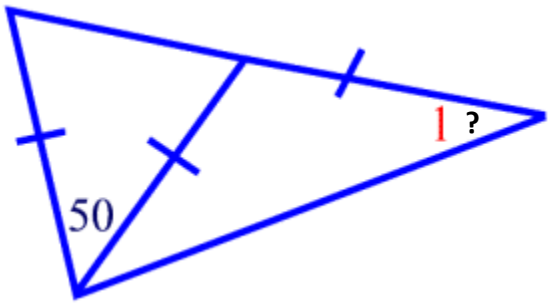
A. Translation
B. Dilation
C. Reflection
D. Rotation
E. None of the above

38. **Which view** of the stack of cubes is shown in the isometric drawing below:



A. Top
B. Corner
C. Back
D. Front
E. None of the above

39. Find $m\angle 1$.



A. 32.5^{o}
B. 65^{o}
C. 40^{o}
D. 57.5^{o}
E. None of the above

40. Find the **height of the tree** if you know the height of the flagpole is 30 feet and its shadow is 14 ft. The shadow of the tree is 12.5 ft.

A. 26.8 ft.
B. 27.7 ft.
C. 28.3 ft.
D. 25.9 ft.
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 _____

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