

2011 KCATM
Geometry Individual Test

1. Find the circumcenter of the triangle with the given vertices:
 $D(0,7)$, $E(-3,1)$, $F(3,1)$
 - a. $(0, 5)$
 - b. $(3.25, 0)$
 - c. $(0, 3.25)$
 - d. $(5,0)$
2. What kind of triangle has the same point for the incenter and the circumcenter?
 - a. Isosceles
 - b. Obtuse
 - c. Right
 - d. Equilateral
3. Right triangle FGH has midsegments of length 10 centimeters, 24 centimeters and 26 centimeters. What is the area of triangle FGH ?
 - a. 60 cm sq.
 - b. 120 cm sq.
 - c. 240 cm sq.
 - d. 480 cm sq.
4. The distance from Jacksonville to Tampa is 171 miles. The distance from Tampa to Miami is 206 miles. Use the triangle Inequality Theorem to find the range for the distance from Jacksonville to Miami.
 - a. $0 \text{ mi} < d < 35 \text{ mi}$
 - b. $0 \text{ mi} < d < 377 \text{ mi}$
 - c. $35 \text{ mi} < d < 377 \text{ mi}$
 - d. $-35 \text{ mi} < d < 377 \text{ mi}$

5. Two cyclists start from the same location and travel in opposite directions for 2 miles each. Then the first cyclist turns right 90 degrees and continues for another mile. At the same time, the second cyclist turns 45 degrees left and continues for another mile. At this point, which cyclist is closer to the original starting point?

- a. the first cyclist
- b. the second cyclist
- c. not enough information

6. A right triangle has a leg that is 30 ft, and a hypotenuse that is 34 ft. What is the length of the other leg?

- a. 45.34
- b. 30
- c. 9
- d. 16

7. Tell whether the measures 6, 7, and $3\sqrt{13}$ can be the side lengths of a triangle. If so, classify the triangle as acute, obtuse or right.

- a. not a triangle
- b. yes, acute
- c. yes, obtuse
- d. yes, right

8. Find the value of x if the legs of a right triangle are 9 and x, and the hypotenuse is x+1.

- a. $x = 40$
- b. $x = 30$
- c. $x = 25$
- d. $x = 20$

9. A cube has edge lengths of 6 inches. What is the approximate length of the diagonal of the cube?

- a. 6 in
- b. 8.4 in
- c. 10.4 in
- d. 12 in

10. An isosceles right triangle has sides length x , x , and $x + 4$. Find the value of x .

- a. $2\sqrt{3} + 2$
- b. $4\sqrt{2} + 2$
- c. $2\sqrt{3} + 4$
- d. $4\sqrt{2} + 4$

11. A 30-60-90 right triangle has a hypotenuse of $24\sqrt{3}$. Find the two legs.

- a. $12\sqrt{3}, 12$
- b. $12\sqrt{3}, 36$
- c. $6\sqrt{3}, 16$
- d. $6\sqrt{3}, 12$

12. Use the Polygon Sum Theorem to find the sum of the interior angle measures of a regular hexagon.

- a. 560 degrees
- b. 720 degrees
- c. 860 degrees
- d. 920 degrees

13. A figure is an equiangular 18-gon. What is the measure of each exterior angle of the polygon.

- a. 10 degrees
- b. 18 degrees
- c. 20 degrees
- d. 36 degrees

14. A model airplane has a wingspan of 15 inches. The actual airplane has a wingspan of 30 feet and a length of 42 feet. How long is the model?

- a. 11 inches
- b. 14 inches
- c. 21 inches
- d. 30 inches

15. In ΔQRS , the bisector of angle R divides \overline{QS} into segments with lengths 2.1 and 2.8. If $RQ = 3$, which is the length of RS?

- a. 2
- b. 2.25
- c. 4
- d. 4.5

16. The altitude to the hypotenuse of a right triangle divides the hypotenuse into segments that are x and $4x$ cum, respectively. What is the length of the altitude?

- a. $2x$
- b. $2.5x$
- c. $5x$
- d. $4x^2$

17. Janie is cutting out 32 right triangles from fabric for her quilt. The shortest side of each triangle is 2 inches, and the longest side is 5 inches. How much fabric will she use to cut out all the triangles?

- a. 146.6 square inches
- b. 293.3 square inches
- c. 366.6 square inches
- d. 672 square inches

18. Find the area of a regular hexagon with an apothem of 18 inches.

- a. 972 square inches
- b. 1122.4 square inches
- c. 1244.6 square inches
- d. 1424.8 square inches

19. A graph showing the top view of a circular fountain has its center at (4,6). The circle representing the fountain passes through (2,1). What is the area of the space covered by the fountain?

- a. $\sqrt{29}\pi$
- b. $2\sqrt{29}\pi$
- c. 29π
- d. 58π

20. In kite RSTU, $RT = 2.5$ centimeters and $SU = 4.3$ centimeters. Both diagonals of the kite are doubled. What happens to the area of the kite?

- a. The area is doubled.
- b. The area is tripled
- c. The area is 4 times as great.
- d. The area is 8 times as great.

21. Which does not describe a polyhedron?

- a. 8 vertices, 12 edges, 6 faces
- b. 8 vertices, 10 edges, 6 faces
- c. 6 vertices, 9 edges, 5 faces
- d. 6 vertices, 10 edges, 6 faces

22. A cylindrical juice container has a diameter of 6 inches, and a height of 12 inches. About how many cups of juice does this container hold? (Hint: 1 cup = 14.44 inches cubed)

- a. 23.48 cups
- b. 18.64 cups
- c. 16.42 cups
- d. 14.22 cups

23. What is the volume of a sphere with a great circle that has an area of 225π centimeters squared?

- a. 300π centimeters cubed
- b. 900π centimeters cubed
- c. 2500π centimeters cubed
- d. 4500π centimeters cubed

24. Circle G has a center at (2,5) and a radius of 3. Circle H has a center at (2,0). If the circles are tangent, which line could be tangent to both circles?

- a. $x = 2$
- b. $x = 0$
- c. $y = 2$
- d. $y = 5$

25. The center of circle S is (9,2), and the radius of the circle is 5 units. Which is a point on the circle?

- a. (4,2)
- b. (14,0)
- c. (9,4)
- d. (9, -5)

26. ΔKLM with vertices $K(8, -1)$, $L(-1,-4)$, and $M(2,3)$ is rotated 180 degrees about the origin. The image is then translated. The final image of K has coordinates (-2,-3). What is the translation vector?

- a. (6,4)
- b. (6, -4)
- c. (-1, -11)
- d. (-10,-2)

27. Two airplanes depart from an airport at $A(9,11)$. The first plane travels to a location at $N(-250,80)$, and the second plane travels to a location at $P(105, -400)$. Each unit represents one mile. What is the distance, to the nearest mile between the two airplanes?

- a. 335.3 mi
- b. 477.9 mi
- c. 490.3 mi
- d. 597.0 mi

28. A rectangular piece of cloth 15 centimeters long is cut along a diagonal to form two triangles. One of the triangles has a side length of 9 centimeters. Which is a true statement?

- a. The second triangle has an angle measure of 15 degrees by CPCTC.
- b. The second triangle has a side length of 9 centimeters by CPCTC.
- c. You cannot make a conclusion about the side length of the second triangle.
- d. The triangles are not congruent.