Name _____ School _____

KCATM **Geometry Team** **2013**

1) Suppose $\angle AXB$, $\angle BXC$, and $\angle CXA$ are congruent angles in the same plane with no common interior points. If the sum of their measures is 360° and $\overline{XY}$ is the bisector of $\angle AXB$, which of the following is true?

a) $\angle AXY \cong \angle BXC$
b) $\angle BXC \cong \angle BXY$
c) $\overrightarrow{XC}$ and $\overrightarrow{XY}$ are opposite rays
d) $\angle AXC$ and $\angle YXB$ are vertical angles

2) Find the second endpoint of the segment with one endpoint at (7, 2) and midpoint (5, -3).

a) (6, -0.5)
b) (7, -3)
c) (3, -8)
d) (6, -8)

3) Which conjecture is always true based on the given information?
Given: $\angle 1 \cong \angle 2$ and $\angle 2 \cong \angle 3$

a) $\angle 1 \cong \angle 3$
b) $\angle 1$ is adjacent to $\angle 3$
c) $\angle 1$ is complementary to $\angle 3$
d) None of these

4) Find the measure of two complementary angles if the measure of one angle is 24 more than the measure of the other.

a) 33, 57
b) 24, 66
c) 33, 147
d) 66, 114

5) Suppose q and r are two lines intersected by transversal t. If one of the angles formed by q and t is congruent to every angle formed by r and t, which of the following must be true?

a) r ∥ t
b) q ⊥ r
c) q ∥ t
d) r ⊥ t

6) $\overline{BC}$ and $\overline{DE}$ intersect at *S*, *T* is in the interior of $\angle BSD$, $m\angle ESB = 2x - y$, $m\angle BST = x$, and $m\angle TSD = y$. Find the values of *x* and *y* for which $\overline{BC} \perp \overline{DE}$.

a) $x = 110, y = 70$

b) $x = 60, y = 30$

c) $x = 45, y = 45$

d) $x = 50, y = 40$

7) Line *f* has a slope of -4. Which of the following is true about *f*?

a) *f* is horizontal.
b) *f* falls to the right.
c) *f* falls to the left.
d) *f* is vertical.

8) What is the distance from the point at (-1, -3) to the line y = 2?

a) 4
b) 2
c) -3
d) 5

9) The relationship "is perpendicular to" has which of the following properties?

a) Reflexive
b) Symmetric
c) Transitive
d) Congruence

10) Determine the value of *r* so that a line through the points at (*r*, 3) and (7, 4) has a slope of ½.

a) 7
b) 5
c) -1
d) 2

11) Points $A(3, 5)$ and $B(-1, -3)$ lie on the line $y = 2x - 1$. Determine which of the following points is collinear to A and B.

a) $T(4, 6)$

b) $Q(-3, -1)$

c) $R(1, 1)$

d) $L(3, -3)$

12) For ΔXYZ, $\angle 1$, $\angle 2$, and $\angle 3$ are exterior angles with vertices at X, Y, and Z respectively. Find the sum of the measures of $\angle 1$, $\angle 2$, and $\angle 3$.

a) 90

b) 180

c) 270

d) 360

13) Determine the truth of the statement: $\overrightarrow{CD}$ and $\overrightarrow{CE}$ form $\overleftrightarrow{DE}$.

a) Always true

b) Sometimes true

c) Never true

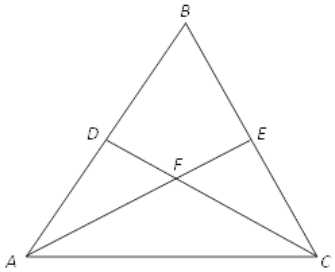
14) Determine which triangles in the figure are congruent if $\angle BAE \cong \angle BCD$ and $\overline{BD} \cong \overline{BE}$.

a) $\Delta ABE \cong \Delta CBD$

b) $\Delta ADF \cong \Delta CEF$

c) $\Delta ADC \cong \Delta CEA$

d) $\Delta ABC \cong \Delta AFC$



15) Which of the following might be the coordinates of the vertices of ΔPQR if ΔPQR is a right isosceles triangle?

a) $P(3, 4)$, $Q(7, 6)$, $R(5,1)$

b) $P(7,6)$, $Q(11, 6)$, $R(10, 10)$

c) $P(4, 4)$, $Q(10, 7)$, $R(7, -2)$

d) $P(5, 5)$, $Q(15, 5)$, $R(10, 15)$

16) In ΔEFG, $m\angle E = 6x - 8$, $m\angle F = 7x + 3$, and $m\angle G = 3x - 7$. Choose the list that shows the sides correctly ordered from longest to shortest.

a) $\overline{EG}, \overline{FE}, \overline{GF}$
b) $\overline{FE}, \overline{EG}, \overline{GF}$
c) $\overline{EG}, \overline{GF}, \overline{FE}$
d) $\overline{GF}, \overline{EG}, \overline{FE}$

17) If the sides of a triangle have measures $3x + 4$, $6x - 1$, and $8x + 2$, find all possible values of x.

a) $x > -1$
b) $x > -7/5$
c) $x > 3/11$
d) $x > 0$

18) Given $\Delta MON \cong \Delta PQR$ with $MO = 20$, $MN = 32$, and $PR = 3x - 10$, find the value of x.

a) 10
b) 14
c) 30
d) 42

19) The measures of the angles of a triangle are in the ratio 2:4:9. Which is a measure of one of the angles?

a) 12
b) 36
c) 48
d) 105

20) In a right triangle, the measure of the legs are 9 and $x + 8$, and the measure of the hypotenuse is $x + 9$. Find the value of x.

a) 32
b) 12
c) 64
d) 15

21) The perimeter of a rectangle is 34 feet and its width is 6 feet. Find the area of the rectangle.

a) 66 square feet

b) 84 square feet

c) 132 square feet

d) 204 square feet

22) Not all rectangles have

a) diagonals that bisect each other.

b) diagonals that are congruent.

c) four congruent sides.

d) consecutive angles that are supplementary.

23) Which statement is sufficient to prove that quadrilateral *GHIJ* is a parallelogram?

a) $m\angle G \cong m\angle I$, $m\angle H \cong m\angle J$

b) $\overline{GH} \cong \overline{IJ}$

c) $\overline{GI} \cong \overline{HJ}$

d) $\overline{HI} \parallel \overline{GJ}$

24) If one angle of a parallelogram measures 65°, find the measures of the other three angles.

a) 65°, 65°, 65°

b) 65°, 25°, 25°

c) 50°, 50°, 130°

d) 65°, 115°,115°

25) How many 8-inch square flagstones are needed for a patio 14 feet long and 10 feet wide?

a) 17.5 stones

b) 140 stones

c) 200 stones

d) 315 stones

26) How much further do you ride in one turn of a merry-go-round if you sit in the outer lane, 21 feet from the center, than if you sit in the inside lane, 14 feet from the center?

a) 7 feet
b) 14 feet
c) 22 feet
d) 44 feet

27) Helmut is photographing his dog. Suppose his dog is 200 cm from the camera lens and the film is 1.5 cm from the lens. If the dog is 80 cm tall, how tall is the image on the film?

a) 0.375 cm
b) 0.6 cm
c) 0.8 cm
d) 1.7 cm

28) How many sides does a regular polygon have if the measure of one interior angle is 144°?

a) 8
b) 9
c) 10
d) 12

29) Reddie's Pizza Bash is famous for its Loads-o-Meat Deluxe Pizza. It comes in three sizes: small (13 inches) for $11.75, large (16 inches) for $14.75, and super (19 inches) for $22.75. Which size is the best deal?

a) Small
b) Large
c) Super
d) They are all the same

30) If a forest ranger can see from her tower for a distance of 42 kilometers in all directions, how many square kilometers can she watch?

a) 132 square kilometers
b) 1385 square kilometers
c) 1764 square kilometers
d) 5539 square kilometers

31) Find the surface area of a sphere with a radius of 5 inches.

a) 100π square inches
b) 166 2/3 π square inches
c) 50π square inches
d) 83 1/3 π square inches

32) A sphere is inscribed in a cube. Find the ratio of the volume of the cube to the volume of the sphere.

a) $2:\frac{1}{3}\pi$
b) $2:3\pi$
c) $1:\frac{4}{3}\pi$
d) $1:\frac{2}{3}\pi$

33) A sphere is placed inside a cube so that it just touches all six faces of the cube. If an edge of the cube is 8 inches, what is the volume of the sphere?

a) 50 cubic inches
b) 201 cubic inches
c) 268 cubic inches
d) 2144 cubic inches

34) The diameter of the Earth is approximately 7,920 miles; the diameter of the moon is approximately 2,160 miles. How many moons could fit inside the Earth?

a) 3 2/3
b) 13
c) 25
d) 49

35) Find the volume of a 4.2 cm diameter cylinder that has a height of 5.5 cm and a cylindrical hole 2 cm in diameter.

a) 17.27 cubic centimeters
b) 58.89 cubic centimeters
c) 76.16 cubic centimeters
d) 235.56 cubic centimeters

36) Which of the following has only one line of symmetry?

- **a)** Square
- **b)** Regular pentagon
- **c)** Isosceles trapezoid
- **d)** Equilateral triangle

37) Which does not represent the possible intersection of a line and a square?

- **a)** 0 points
- **b)** 1 points
- **c)** 2 points
- **d)** 3 points