Choose the best answer from A, B, C, or D

_____ 1. A pole-vaulter uses a 15-foot-long pole. She grips the pole so that the segment below her left hand is twice the length of the segment above her left hand. Her right hand grips the pole 1.5 feet above her left hand. How far up the pole is her right hand?

A. 7.5 feet
B. 9 feet
C. 11.5 feet
D. 13 feet

_____ 2. On a subway route, station C is located at the midpoint between stations A and D. Station B is located at the midpoint between stations A and C. If the distance between stations A and D is 2.4 kilometers, what is the distance between stations B and D?

A. 0.3 km
B. 0.6 km
C. 1.2 km
D. 1.8 km

_____ 3. Longitude is a measurement of position around the equator of Earth. Longitude is measured in degrees, minutes and seconds. Each degree contains 60 minutes, and each minute contains 60 seconds. Minutes are indicated by the symbol ' and seconds are indicated by the symbol ". Williamsburg, VA, is located at 76º 57' 30". Roanoke, VA is located at 79º 37' 10". Find the difference of their longitudes in degrees, minutes, and seconds.

A. 3º 20' 20"
B. 2º 39' 40"
C. 2º 79' 80"
D. 3º 20' 20"

_____ 4. Ray VX bisects angle WVY, and the measure of angle WVX is $(6x)º$, and the measure of angle WVY is $(6x - 42)º$. What is the value of x?

A. 21/11
B. 42/13
C. 4.2
D. 10.5

_____ 5. Angle R and angle S are complementary. If the measure of angle R is (7 + 3x)° and the measure of angle S is (2x + 13)°, which is a true statement?

A. Angle R is acute
B. Angle R is obtuse
C. Angle R and angle S are right angles
D. The measure of angle S equals the measure of angle R

_____ 6. Find the area of a regular octagon with sides of 2.5 inches that is circumscribed about a circle of radius 3.

A. 28.26 sq. in.
B. 33.75 sq. in.
C. 31.0 sq. in.
D. 30.0 sq. in.

_____ 7. Use the distance formula to find the distance, to the nearest tenth, between K(-7, -4) and L(-2, 0).

A. 6.4
B. 9.8
C. 8.1
D. 7.1

_____ 8. Suki found a treasure map that was laid out on a grid. T had coordinates (3,12) and U had coordinates (7,2) and V had coordinates (13,13). Suki read the map's instructions:

First, find the midpoint of segment UV, or the treasure forever lost will be.
Label this dreadful midpoint W, or being well-off will never trouble you.
W is in line with and between T and X, X! How clichéd! Can you guess what is next?
TX is exactly two times TW, be sure at X to bring a shovel or two.

Name the coordinate where Suki found the treasure:

A. (16, 4)
B. (18, 4)
C. (17, 3)
D. (18, 3)

_____ 9. Determine the coordinates of any point A(x,y) reflected across the x-axis and then across the y-axis, and then rotated 180° around the origin.

A. (-x, -y)   C. (x, y)
B. (y, -x)   D. (x, -y)

_____ 10. Two coplanar lines are cut by a transversal. Which condition does NOT guarantee that the two lines are parallel?

A. A pair of alternate interior angles are congruent.
B. A pair of same-side interior angles are supplementary
C. A pair of corresponding angles are congruent.
D. A pair of alternate exterior angles are complementary.

_____ 11. Use the slopes of the given lines to determine whether the lines are parallel, perpendicular, or neither.

Line JK and line JL for J(-4, -2), K(4, -2), and L(-4, 6)

A. Parallel
B. Perpendicular
C. Neither

_____ 12. Audrey is trying to decide between two health care plans. After how many months would the plans' total costs be the same if the enrollment fee for plan A is $140, and the monthly fee is $35, and the enrollment fee for plan B is $60, and the monthly fee is $55?

A. 3 months
B. 4 months
C. 5 months
D. 6 months

_____ 13. If the length of the hypotenuse of a right triangle is 17 units, and the legs lie along the x-axis and the y-axis, find a possible equation that describes the line that contains the hypotenuse.

A. $y = -8/13 \ x + 9$
B. $y = - 9/16 \ x + 7$
C. $y = - 7/ 16 \ x + 8$
D. $y = -8/15 \ x + 8$

_____ 14. Which of the following is an equation of the line that passes through the point (2, -3) and is parallel to the line $4x - 5y = 1$?

A. $-4x + 5y = -23$
B. $-5x - 4y = 2$
C. $-2x - 5y = 11$
D. $-4x - 5y = 7$

_____ 15. The measure of each angle in a triangle is a multiple of 30°. What is the probability that the triangle has at least two congruent angles?

A. 3/4
B. 1/3
C. 2/3
D. 3/5

_____ 16. In triangle ABC, the measure of angle B is 5° less than 1.5 times the measure of angle A, and the measure of angle C is 5° less than 2.5 times the measure of angle A. What is the measure of angle A in degrees?

A. 32
B. 35
C. 38
D. 39

_____ 17. Which conditional statement has the same truth value as its inverse?

A. If n ‹ 0, then n^2 › 0.
B. If a triangle has three congruent sides, then it is an isosceles triangle.
C. If an angle measures less than 90°, then it is an acute angle.
D. If n is a negative integer, then n ‹ 0.

_____ 18. Which of the following is NOT valid for proving that triangles are congruent?

A. SSA
B. ASA
C. SAS
D. HL

_____ 19. Find the circumcenter of the triangle with the given vertices:
A(-7, 0), O(0, 0), B(0, -10)

A. (-4, -5)
B. (-3, -5.5)
C. (-3.5, -5.5)
D. (-3.5, -5)

_____ 20. Which of the following is **never** true?

A. An angle bisector of a triangle bisects the opposite side.
B. A perpendicular bisector of a triangle passes through the opposite vertex.
C. The incenter of a right triangle is on the triangle.
D. The circumcenter of a scalene triangle is inside the triangle.

_____ 21. Which of the following is **always** true?

A. A median of a triangle bisects one of the angles.
B. In an isosceles triangle, the altitude and median from the vertex angle are the same line as the bisector of the vertex angle.
C. The centroid of a triangle lies in its exterior.

_____ 22. Suppose the orthocenter of a triangle lies outside the triangle. Which points of concurrency are inside the triangle?

A. the incenter and the circumcenter only
B. the incenter and the centroid only
C. the circumcenter and the centroid only
D. the incenter, the circumcenter and the centroid

_____ 23. A bag contains five sticks. The lengths of the sticks are 1 inch, 3 inches, 5 inches, 7 inches, and 9 inches. Suppose you pick three sticks from the bag at random. What is the probablility you can form a triangle with the three sticks?

A. 1/5
B. 3/10
C. 2/5
D. ½

_____ 24. Name the convex polygon whose interior angle measures have the given sum: 1800°

A. Pentagon
B. Heptagon
C. Dodecagon
D. 16-gon

_____ 25. How many sides does a regular polygon have to have so that each interior angle is four times the measure of each exterior angle?

A. 7
B. 8
C. 9
D. 10

_____ 26. Which of the following has a geometric mean of 6 times the square root of 3?

A. 4 and 16
B. 7 and 11
C. 16 and 25

D. 9 and 12

_____27. The geometric mean of two numbers is 2 times the square root of 5. One of the numbers is 6. Find the other number.

A. 10/3
B. 9/4
C. 11/3
D. 12/5

_____ 28. An eight-inch-long altitude of a right triangle divides the hypotenuse into two segments. One segment is 4 times as long as the other. What are the lengths of the segments of the hypotenuse?

A. 3 inches and 12 inches
B. 4 inches and 16 inches
C. 5 inches and 20 inches
D. 6 inches and 24 inches

_____ 29. The Great Pyramid of Cheops in Giza, Egypt, was completed around 2566 B.C. Its original height was 482 ft. Each face of the pyramid forms a 52° angle with the ground. To the nearest foot, how long was the base of the pyramid?

A. 699 ft.
B. 722 ft.
C. 735 ft.
D. 753 ft.

_____ 30. A regular pentagon with 1 inch sides is inscribed in a circle. Find the radius of the circle rounded to the nearest hundredth.

A. 0.85
B. 0.87
C. 0.89
D. 0.91

_____ 31. A plane is flying at a constant altitude of 14,000 feet and a constant speed of 500 mi/hr. The angle of depression from the plane to a lake is 6°. To the nearest minute, how much time will pass before the plane is directly over the lake?

A. 3 minutes
B. 4 minutes
C. 5 minutes
D. 6 minutes

_____ 32. Triangle ABC is an isosceles triangle. The length of CB is 12 feet 4 inches, and the congruent sides are each ¾ of this length. What is the perimeter or triangle ABC?

A. 31 ft 4 in.
B. 30 ft 10 in.
C. 21 ft 7 in.
D. 18 ft 6 in.

_____ 33. An isosceles trapezoid has one pair of noncongruent parallel sides, a pair of congruent nonparallel sides, and two pairs of congruent angles. What relationship do the diagonals of an isosceles trapezoid have?

A. The diagonals are perpendicular to each other.
B. The diagonals bisect each other.
C. The diagonals are perpendicular bisectors of each other.
D. The diagonals are congruent.

_____ 34. 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.

_____ 35. Two airplanes depart from an airport at A(9, 11). The first airplane travels to a location at N(-250, 80), and the second airplane travels to a location at P(105, -400). Each unit represents 1 mile. What is the distance, to the nearest mile, between the two airplanes?

A. 335.3 miles
B. 477.9 miles
C. 490.3 miles
D. 597.0 miles