***If none of the above answers are correct, choose NOTA. Good luck!***

1. How many faces does a polyhedral solid with 18 vertices and 32 edges have?

 (A) 14 (B) 16 (C) 18 (D) 28 (E) NOTA

2. Only one of the following statements is false, all the others are true. Find the false statement(s).

 A. Statement “b”, “c”, or “d” is false.

 B. If statement “c” is false, then statement “d” is true.

 C. It is not true that statement “e” is false.

 D. Statements “b” and “c” have the same truth values.

 E. If statement “a” is true, then “c” is false.

 (A) A (B) B (C) C and D (D) E (E) NOTA

3. What is the value of the following product?

 (A) 0 (B) 0.5 (C) 1 (D) 2 (E) NOTA

4. Determine the area of a triangle with a perimeter of 36 and an inradius of 6.

 (A) 54 (B) 72 (C) 108 (D) 216 (E) NOTA

5. Define P(n) as the sum of the exterior angles (one at each angle and in degrees) of an n-sided convex polygon. Compute P(4) + P(5) + … + P(n) in terms of n.

(A) 360n (B) 360n – 360 (C) 360n - 720 (D) 360n – 1080 (E) NOTA

6. The points A, B, C, D and E are located on a straight line, in order, in accordance with the following conditions. What is the distance from B to C?

 The distance from A to E is 20cm.

 The distance from A to D is 15cm.

 The distance from B to E is 10cm.

 C is halfway between B and D.

 (A) 1.5 cm (B) 2 cm (C) 2.5 cm (D) 5 cm (E) NOTA

7. What is the maximum number of times a circle and a square might intersect?

 (A) 4 (B) 8 (C) 10 (D) 12 (E) NOTA

8. If the graphs of the equations 3x – 5y + 4 = 0 and 2x + ay = 11 = 0 intersect at right angles, find the value of a.

 (A) (B) (C) (D) (E) NOTA

9. Find the area of the region in the xy – plane. .

 (A) 1 (B) 2 (C) 3 (D) 4 (E) NOTA

10. On a circle, 2K + 1 evenly spaced points are numbered 0 thru 2K in succession. Determine the measure of the angle formed at Point K by connecting the Point 0 to Point K to Point 2K.

 (A) (B) (C) (D) (E) NOTA

11. The trapezoid PART has and . The three congruent sides have length s. Find the length of the median in terms of s.

s

R

A

 (A)

s

s

P

T

 (B) 2s

 (C) 3s

 (D) 4s

 (E) NOTA

12. A snail traveling on flat ground leaves Point X and walks 6 inches in a straight path to Point Y, then turns and walks 12 inches in a straight path to Point Z. The snail turns again and walks 14 inches in a straight path back to Point X. What is the area of the triangle whose vertices are X, Y and Z?

 (A) 36 (B) 42 (C) (D) (E) NOTA

13. The circles in the figure are concentric. The chord is tangent to the inner circle and has length 12. What is the area of the non-shaded region?

(A) 36π (B) 72π (C) 108π (D) 144π (E) NOTA

14. Archimedean Solids can be obtained by truncating one of the Platonic Solids. Let a = number of triangular faces, b = number of square faces and c = number of octagonal faces on a truncated cube. Determine the value of (a, b, c).

 (A) (8, 6, 0) (B) (0, 4, 4) (C) (0, 8, 6) (D) (8, 0, 6) (E) NOTA

15. Which of the following is ***not*** one of the ancient impossible constructions in Euclidean geometry?

 (A) squaring the circle (B) doubling the square (C) doubling the cube (D) trisecting an angle (E NOTA

16. A right triangle with integer side lengths a, b, and c satisfies a < b < c and c - a = 9. What is the area of the right triangle?

(A) 30 (B) 72 (C) 76 (D) 84 (E) NOTA

17. The information about students participating on a field trip is as follows:

 36 were female students

 13 were male seniors

 41 were not drama majors

 Exactly half of the drama majors were male

 One third of the female students were drama majors but not seniors

 There were 15 senior drama majors and 20% of which were male

 How many students were on the trip?

 (A) 89 (B) 90 (C) 99 (D) 105 (E) NOTA

18. A triangle has side lengths of x, z, and z. The area of the rectangle with side lengths of x and z is a two digit number with both digits equal to z. The sum of the digits in x is one-third the value of z. What is the area of the rectangle?

(A) 27 sq units (B) 30 sq. units (C) 48 sq. units (D) 66 sq units (E) NOTA

19. One line has a slope of m and a y-intercept of 2. A different line has a slope of 2 and a y-intercept of m. At what coordinates, in terms of m, must the lines intersect?

 (A) (m, m) (B) (m+2, 1) (C) (-1, m + 2) (D) (1, m+2) (E) NOTA

20. North’s rectangular fish tank measures 10m x 6m x 4m high. When North tilted the tank to rest it on the 6m edge, the water level reached the midpoint of the base. When North returned the tank to the horizontal position, what was the depth of the water?

 (A) 1 (B) 2 (C) 3 (D) 4 (E) NOTA

21. ABCD is a parallelogram with A(0, 0), B(20, 10) and D(10, y). If the area of the parallelogram is 600, what is the value of y?

 (A) 20 (B) 25 (C) 35 (D) 40 (E) NOTA

22. Consider a quadrilateral whose vertices, A, B, C and D, are on a circle. Let x, y and z, be the truth values of the following three statements. What is the value of the ordered triple (x, y, z)?

 x: For quadrilateral ABCD, .

 y: The perimeter of quadrilateral ABCD is greater than twice the diameter of the circle.

 z: The perpendicular bisector of any side will pass through the circle’s center.

 (A) (F, F, T) (B) (F, T, T) (C) (T, T, T) (D) (T, F, T) (E) NOTA

23.  is a diameter of circle O with radius 1 inch.  is a chord perpendicular to  that cuts  at point E. If the arc CAD is  of the circumference of the circle, what is the length of the segment AE?

 (A)  (B)  (C)  (D)  (E) NOTA

24. Parallelogram PQRS has PQ = RS = 8cm, and diagonal QS = 10cm. Point F is on segment RS, exactly 5 cm from S. Let T be the intersection of segments PF and QS. Find the length of TS.

 (A)  (B)  (C)  (D)  (E) NOTA

25. Regular octagon ABCDEFGH, with its vertices labeled in clockwise order, is drawn on a rectangular coordinate plane. The coordinates of A are (4, 0) and the coordinates of B are (0, 4). If the coordinates of vertex E are (p, q), compute p – q.

 (A) -4 (B) 0 (C) 4 (D)  (E) NOTA

26. Three mutually tangent spheres of radius 1 rest on a horizontal plane. A sphere of radius 2 rests on the top of them. What is the distance from the plane to the top of the larger sphere?

 (A)  (B)  (C)  (D)  (E) NOTA

27. The woodpecker pecked at a 15 meter wooden pole perpendicular to the ground until it cracked and the upper part fell, with the top hitting the ground 10 meters from the foot of the pole. Since the upper part had not completely broken off, the woodpecker pecked where the pole had cracked. How far was the woodpecker above the ground?

 (A)  (B) 5 (C)  (D)  (E) NOTA

28. Two poles, p feet and q feet in length are placed x feet apart. Lines are drawn from the top of each pole to the bottom of the other. The two lines will intersect at how many feet above the ground? Assume the poles are perpendicular to the ground.

 (A)  (B)  (C)  (D)  (E) NOTA

29. The composition  can also be expressed as which of the following single transformation? Note:  represents reflection; T represents translation; D represents dilation; R represents rotation.

 (A)  (B)  (C)  (D)  (E) NOTA

30. Given the following two circles, find the algebraic equation of the chord they share in common.

 Circle I: 

 Circle II: 

(A) 4x – 3y = 1 (B) 3x + 4y = 1 (C) 2x – y = 10 (D) x – 3y = 5 (E) NOTA