PICK (E) NOTA IF NONE OF THE ABOVE ANSWERS ARE CORRECT.

1. Compute the area of a circle with radius 5π.
   (A) 5π (B) 25π (C) $25\pi^2$ (D) $25\pi^3$ (E) NOTA

2. Peetah Ri, the farmer, has 100 feet of fencing. He is making a garden in any shape he desires using the fencing. What shape should he make the garden in if he wishes to maximize its area?
   (A) Circle (B) Triangle (C) Square (D) Chiliagon (E) NOTA

3. Peetah Ri, the farmer, has a garden in the shape of a rectangle. He wants to make a fence along the diagonal of the plot in order to divide the rectangle into two areas, in which he will plant different crops. Given that the side lengths of the garden are 5 and 12, what is the length of the fence?
   (A) $\sqrt{119}$ (B) 13 (C) 17 (D) 33 (E) NOTA

4. In $\triangle ABC$, angle bisector AD is drawn with D on BC. If $BC = 5, AC = 6$, and $AB = 7$, find the length of BD.
   (A) $\frac{35}{13}$ (B) $\frac{30}{13}$ (C) $\frac{5}{2}$ (D) $\frac{29}{15}$ (E) NOTA

5. Circle O is inscribed within square $ABCD$ with side length 6. What is the area of the region that is inside the square but outside the circle?
   (A) $36 - 6\pi$ (B) $36 - 9\pi$ (C) $36 - 12\pi$ (D) $36 - 36\pi$ (E) NOTA

6. A tire with radius 5 meters is rolling on a flat surface. How many whole revolutions does it make travelling a distance of 500 meters?
   (A) 14 (B) 15 (C) 16 (D) $\frac{50}{\pi}$ (E) NOTA

7. The measures of the angles of a triangle are in the ratio of $2 : 3 : 4$. Find the measure in degrees of the smallest angle of the triangle.
   (A) 20 (B) 40 (C) 60 (D) 80 (E) NOTA

8. $\triangle ABC$ is similar to $\triangle DEF$ with $\frac{AB}{DE} = \frac{6}{7}$. Compute $\frac{[ABC]}{[DEF]}$ (Note: $[H]$ denotes the area of the region H).
   (A) $\frac{6}{7}$ (B) $\frac{1}{2}$ (C) $\frac{36}{49}$ (D) $\frac{216}{343}$ (E) NOTA

9. Given a circle, what is the **exact** ratio of its circumference to its diameter?
   (A) 3 (B) 3.14 (C) 3.14159265 (D) 3.1415926535897932 (E) NOTA

10. Given a nondegenerate triangle with two sides of length 12 and 15, what is a possible side length of the third side?
    (A) 2 (B) 3 (C) 27 (D) 28 (E) NOTA

11. Trapezoid $ABCD$ has $\overline{AD}||\overline{BC}$, $AD = 20$ and $BC = 10$. Given that $AB = 6$ with $\angle BAD = 45°$, compute the area of $ABCD$.
    (A) $45\sqrt{2}$ (B) $90\sqrt{2}$ (C) $135\sqrt{2}$ (D) $180\sqrt{2}$ (E) NOTA

12. A rectangle with dimensions 15 and 5 has a perimeter of $3x + 2y$, and a semiperimeter of $2x + y$. Compute the value of $x + y$.
    (A) 0 (B) 10 (C) 20 (D) 60 (E) NOTA

13. In a circle with radius 12, a chord is drawn at a distance of 8 from the center. Compute the length of the chord.
(A) $4\sqrt{5}$ (B) $8\sqrt{5}$ (C) $4\sqrt{13}$ (D) $8\sqrt{13}$ (E) NOTA

14. Right $\triangle ABC$ with hypotenuse $\overline{AC}$ has $AB = 6$ and $BC = 12$. Compute the length of the circumradius of $\triangle ABC$.
(A) 6 (B) $12\sqrt{5}$ (C) $3\sqrt{5}$ (D) $6\sqrt{5}$ (E) NOTA

15. For square $ABCD$ with side length 4, equilateral triangle ABE is drawn with E on the exterior of $ABCD$. Compute the length of EC.
(A) $2\sqrt{2+\sqrt{3}}$ (B) $8+4\sqrt{3}$ (C) $2\sqrt{2-\sqrt{3}}$ (D) $8-4\sqrt{3}$ (E) NOTA

16. For square $ABCD$ with side length 2, equilateral triangle ABE is drawn with E on the interior of $ABCD$. Compute the length of EC.
(A) $2\sqrt{2+\sqrt{3}}$ (B) $8+4\sqrt{3}$ (C) $2\sqrt{2-\sqrt{3}}$ (D) $8-4\sqrt{3}$ (E) NOTA

17. What is the measure of an interior angle of a 13-gon?
(A) $\frac{180}{13}$ (B) $\frac{360}{13}$ (C) $\frac{1980}{13}$ (D) $\frac{2340}{13}$ (E) NOTA

18. Pratik, searching for his pet penguin, travels 5 miles north, 5 miles west, and 17 miles south from a certain point across the Antarctic icefields. After his journey, how far is he from his original point?
(A) 13 (B) 15 (C) 17 (D) 27 (E) NOTA

19. A certain region S is defined as the set of points equidistant within the plane from a common point R. This common distance is $r = 5$. Compute the area of S.
(A) 5 (B) 25 (C) 10π (D) 25π (E) NOTA

20. Circle O has radius 13. Let the circumference equal C, the area equal A, and the radius equal R. Compute the value of $\frac{A}{R \cdot C}$.
(A) 1 (B) $\frac{1}{2}$ (C) $\pi/2$ (D) $\frac{1}{169}$ (E) NOTA

21. Given that the diagonal of one face of a cube has length 4, compute the length of the space diagonal of the cube.
(A) 4 (B) $2\sqrt{2}$ (C) $2\sqrt{3}$ (D) $2\sqrt{6}$ (E) NOTA

22. Points A, B, and C lie on a line. Given that $AB = 12$, $AC = 3$, compute the shortest possible length of AC.
(A) 3 (B) 9 (C) 12 (D) 15 (E) NOTA

23. Consider a circle with diameter $\overline{BC}$ and $\triangle ABC$ inscribed in the circle. If $2(AC) = BC$, compute the measure of $\angle ABC$ in degrees.
(A) 30 (B) 60 (C) 90 (D) 120 (E) NOTA

24. Right triangle $\triangle ABC$ is drawn with right angle at B. Given that $AB = 5$ and $BC = 13$, compute the length of AC.
(A) 8 (B) 12 (C) $\sqrt{194}$ (D) 18 (E) NOTA

25. If the side lengths of a triangle are in the ratio 3:8:7, is it acute, obtuse, or right?
(A) Acute (B) Obtuse (C) Right (D) need more info (E) NOTA

26. Consider circle O with line l drawn such that it is tangent to O at A. A chord $\overline{AB}$ is drawn such that minor arc AB has a measure of 156 degrees and point E is chosen on l such that $\angle BAE$ is not greater than 90 degrees. Compute the measure of $\angle BAE$ in degrees.

(A) 156 (B) 78 (C) 120 (D) 60 (E) NOTA

27. Patrick is making crafts. He cuts out a paper triangle of area 72. Then, he pastes a circle to the triangle such that the circle is tangent to all three sides of the triangle and has a radius of 9. Compute the semiperimeter of the triangle.

(A) 8 (B) 9 (C) 10 (D) need more info (E) NOTA

28. A rhombus $ABCD$ is drawn with diagonals of length 6 and 8. Compute the perimeter of the rhombus.

(A) 5 (B) 10 (C) 20 (D) 40 (E) NOTA

29. A ladder of length 25 is placed against the wall such that the top of the ladder is at a height of 15. The the ladder slips and the top of the ladder falls a distance 8. How far is the bottom of the ladder from the wall?

(A) 7 (B) 15 (C) 20 (D) 24 (E) NOTA

30. What is the area of a regular icosagon with side length 1 and apothem of length 2?

(A) 1 (B) 2 (C) 20 (D) 40 (E) NOTA