For all questions, answer choice (E) NOTA means that none of the given answers is correct. Good Luck!

1. Kyle wants to find out how much pie he has. The pie is in the shape of a circle with diameter 13. What is the area of this circle?

   (A) 13π (B) 26π (C) 169π (D) 6.5π (E) NOTA

2. The two legs of a right triangle measure 11 and 60 inches. What is the length of the final side of the triangle, in inches?

   (A) 61 (B) 71 (C) 67 (D) 13 (E) NOTA

3. Solve for x in the given equation:

   $$5x + 4y = 37$$

   (A) $(1, 8)$ (B) $\frac{37 - y}{5}$ (C) $\frac{37 - 4y}{5}$ (D) $\frac{37 - 4y}{4}$ (E) NOTA

4. Find the number of different distinguishable ways to arrange the letters in RICKMAO.

   (A) 420 (B) 700 (C) 5040 (D) 5042 (E) NOTA

5. Joshua has a square of side length 5. Karthik takes Joshua's square and creates a second, smaller square within the original square by connecting the midpoints of the original square. What is the area of Karthik's new square?

   (A) 10 (B) 12.5 (C) 16 (D) $\sqrt{15}$ (E) NOTA

6. What is the length of the angle bisector of an equilateral triangle of side length 4?

   (A) $2\sqrt{3}$ (B) 2 (C) $\sqrt{3}$ (D) $\sqrt{2}$ (E) NOTA

7. Simplify:

   $$(\sqrt{6})(\sqrt{8})(\sqrt{10})(\sqrt{12})$$

   (A) 24 (B) $\sqrt{48}$ (C) $\sqrt{5750}$ (D) $24\sqrt{10}$ (E) NOTA

8. Find the real x-intercept of the polynomial:

   $$y = 4x^3 + 16x^2 - 7x - 28$$

   (A) 4 (B) -28 (C) 16 (D) -7 (E) NOTA

9. Find the coordinates of the intersection between the lines:

   $$5x + 4y = 7$$
   $$9x + 16y = 17$$

   (A) $(1, 1)$ (B) $(1, 2)$ (C) $(2, 1)$ (D) $(0.5, 1)$ (E) NOTA

10. How many letters are in the name of a figure with 7 sides?

    (A) 7 (B) 8 (C) 9 (D) 10 (E) NOTA

11. Find the number of factors of 2017.

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

12. Expand:

$$(3x + 2y)(5x + 3y)$$

(A) $15x^2 + 6y^2$ (B) $40xy$ (C) $15x^2 + 19xy + 6y^2$ (D) $8x + 5y$ (E) NOTA

13. Deekshita has a square pyramid shaped charm with height 5 and base length 8. Diyah has a cone shaped charm with height 5 and radius 5. Find the positive difference between the volume of Diyah's charm and Deekshita's charm.

(A) $\frac{320 - 125\pi}{3}$ (B) $320 - 125\pi$ (C) $125\pi - 320$ (D) $\frac{125\pi - 320}{3}$ (E) NOTA

14. Find the sum of the last 3 digits of 5^{2017}.

(A) 6 (B) 8 (C) 16 (D) 18 (E) NOTA

15. Puneet's car gets 22 miles per gallon. If he has 2 pints of gas left, how many feet can his car travel?

(A) 44 (B) 10560 (C) 52800 (D) 29040 (E) NOTA

16. Vishnu has a bag with five coins. Four of the coins are fair, while the last is a coin with tails on both sides. Vishnu draws a coin out of the bag at random, and flips it three times, with the coin coming up tails all three times. If the coin is flipped a fourth time, what is the probability it comes up tails on that fourth flip?

(A) $\frac{5}{6}$ (B) $\frac{3}{5}$ (C) $\frac{1}{2}$ (D) $\frac{9}{10}$ (E) NOTA

17. Find the slope of the line parallel to the line perpendicular to the line parallel to the line:

$$5x + 7y = 2017$$

(A) $\frac{7}{5}$ (B) $\frac{5}{7}$ (C) $-\frac{7}{5}$ (D) $-\frac{5}{7}$ (E) NOTA

18. Find the sum of the x and y values of the coordinates of the vertex and zeroes of the following parabola:

$$f(x) = 2x^2 - 24x + 64$$

(A) 10 (B) 12 (C) 14 (D) 16 (E) NOTA

19. Evaluate:

$$(2^4 * 3^6)^{\frac{1}{2}} + (2^{12})^{\frac{2}{3}}$$

(A) 364 (B) 108 (C) 354 (D) 72 (E) NOTA

20. Sri really likes chicken and wants to buy some from Sanoor's stove. Sanoor sells chicken nuggets in batches of 5 (small) and 7 (large). What is the greatest possible positive integer number of chicken nuggets Sri cannot obtain by buying a whole number of either small or large batches?

(A) 33 (B) 26 (C) 24 (D) 23 (E) NOTA

21. Find:

$$1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8}...$$

(A) ∞ (B) 1 (C) 2 (D) 3 (E) NOTA

22. Find the sum of the first 100 odd numbers.

(A) 9236 (B) 10035 (C) 9758 (D) 9999 (E) NOTA

23. There are 200 people in the Rickards High School Class of 2017. All 200 students took at least one of three sciences: Biology, Chemistry, or Physics. 31 took only Physics and Biology, 29 took only Biology and Chemistry, and 26 took only Physics and Chemistry. 129 students took Biology, 126 students took Chemistry, and 117 students took Physics. How many students took all three classes?

(A) 28 (B) 34 (C) 43 (D) 57 (E) NOTA

24. What is the least common denominator of 2002 and 1820?

(A) 1821820 (B) 20020 (C) 260260 (D) 14014 (E) NOTA

25. Cherry has seven positive integers, and finds that the median of the seven numbers is 14 and the mode is 14. She also finds that 14 is the smallest number. The sum of the three largest numbers is 49. What is the mean of these seven numbers?

(A) 16 (B) 15 (C) 14 (D) 7 (E) NOTA

26. Find the next number in the sequence:

$$1, 1, 2, 3, 5, 8, 13, 21, ?$$

(A) 24 (B) 26 (C) 29 (D) 34 (E) NOTA

27. One of the most significant and intricate numbers in mathematics is the golden ratio, which can be found by solving for the positive value of ϕ in the equation:

$$\phi = 1 + \frac{1}{\phi}$$

Based on this equation, what is the golden ratio?

(A) $\frac{\sqrt{5}}{2}$ (B) $\frac{1+\sqrt{3}}{2}$ (C) $\frac{1+\sqrt{5}}{2}$ (D) $\frac{5-\sqrt{5}}{2}$ (E) NOTA

28. It takes Rayyan 30 seconds to do a math problem by himself. It takes Jason 40 seconds to do a math problem by himself. If the two work together, how long, in minutes, does it take for them to do 7 problems?

(A) 1.2 (B) 2 (C) 2.5 (D) 3 (E) NOTA

29. Solve for x:

$$\frac{x + \frac{1}{2}}{2y} + 3ab = 4c$$

(A) $x = 8cy - 6aby - \frac{1}{2}$ (B) $x = 2cy - 2aby - \frac{1}{2}$ (C) $x = 8cy - 2y - 3ab - \frac{1}{2}$
(D) $x = \frac{1}{2}$ (E) NOTA

30. Congratulations! You have encountered a math genie ending this test. The genie offers you two choices. You can either earn "Twenty percent of the sum of your score and your age" more points, or you can earn "Twenty percent of your score added to your age" more points. Which option should you choose to maximize your score?

    (A) The first option
    (B) The second option
    (C) The two options lead to the same increase in points
    (D) Both options lead to a decrease in points; reject the genie
    (E) NOTA