1. How many diagonals can be drawn in a convex 10-gon?

    (A) 40   (B) 37   (C) 35   (D) 25   (E) NOTA

2. Solve for x: $\dfrac{x+2}{x-1} = \dfrac{3x-1}{2-2x}$

    (A) $-\dfrac{3}{5}$ (B) 3   (C) 1   (D) $-\dfrac{1}{5}$ (E) NOTA

3. If a line crosses the y-axis at (0,6) and goes through (3,-3), where does it cross the x-axis?

    (A) (-2,0)   (B) (0,-2)   (C) (0,2)   (D) (2,0)   (E) NOTA

4. Determine the value of x in the figure:

   (A) 12   (B) 6   (C) 18
    (D) 1   (E) NOTA
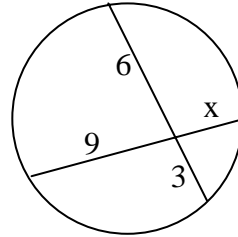
5. What is the probability of rolling a sum of 7 when 2 fair six-sided dice are rolled?

    (A) $\dfrac{1}{9}$ (B) $\dfrac{1}{6}$ (C) $\dfrac{7}{36}$ (D) $\dfrac{4}{9}$ (E) NOTA

6. Three six-year olds are playing with marbles. Barry has four more than Kim does. Lisa has half as many as Barry. Kim counts her marbles and realizes she has her age. How many marbles does Lisa have?

    (A) 4   (B) 3   (C) 1   (D) 5   (E) NOTA

7. What is the algebraic expression of: "Four less than seventeen times a number is ten more than ten times the number."?

    (A) $4-17x = 10+10x$ (B) $4-17x = 10x$
    (C) $17-4x = 10(10+x)$ (D) $17x-4+10 = 10x$ (E) NOTA

8. Determine the value for the number referred to in problem #7.

   (A) $-\dfrac{6}{27}$ (B) $-\dfrac{6}{7}$ (C) 4 (D) 2 (E) NOTA

9. I have 6 shirts, 3 pairs of pants, and 5 pairs of socks. How many possible different outfits do I have (one outfit is one shirt, one pair of pants, and one pair of socks)?

   (A) 90 (B) 14 (C) 70 (D) 180 (E) NOTA

10. Find the slope of the line with the points (1,2) and (2,0).

    (A) 2 (B) -2 (C) 1 (D) -1 (E) NOTA

11. How many natural numbers are factors of 4288?

    (A) 4 (B) 15 (C) 14 (D) 13 (E) NOTA

12. What is the distance between points (-4,6) and (2,3)?

    (A) 9 (B) $-\dfrac{3}{2}$ (C) $5\sqrt{3}$ (D) $3\sqrt{5}$ (E) NOTA

13. Find the measure of an interior angle of a regular 15-gon.

    (A) 144 (B) 140 (C) 156 (D) 150 (E) NOTA

14. An equilangular triangle has a perimeter of 6 cm. What is its area?

    (A) $9\sqrt{3}\ \text{cm}^2$ (B) $18\ \text{cm}^2$ (C) $\sqrt{3}\ \text{cm}^2$ (D) $4\sqrt{3}\ \text{cm}^2$ (E) NOTA

15. Nancy was given some money to spend at the mall by her very nice grandmother. Nancy spent $\dfrac{1}{5}$ of her money on a badly needed sweater, $\dfrac{1}{6}$ of what she had left on a pair of Fourth of July socks, and ate lunch for $\dfrac{1}{3}$ of her remaining money. She then spent $6 on a present for her grandmother, and $\dfrac{1}{7}$ of her leftover money on an ice cream cone, leaving her with $12. How much did she start with?

    (A) $45 (B) $40 (C) $35 (D) $30 (E) NOTA

16. Find the volume of a circular cone whose radius is 3 and height is twice the radius.

    (A) 81π (B) 54π (C) 18π (D) 27π (E) NOTA

17. What is the units digit of 7^{61}?

    (A) 1   (B) 9   (C) 3   (D) 7   (E) NOTA

18. A certain number is half of itself plus half of the number of this problem minus the positive fourth root of 81. What is the number?

    (A) 12   (B) 8   (C) 6   (D) 4   (E) NOTA

19. What is 1101_2 in base 10?

    (A) 12_{10} (B) 1101_{10} (C) 3_{10} (D) 13_{10} (E) NOTA

20. What is the probability of drawing an ace or a heart out of a standard deck of cards?

    (A) $\dfrac{4}{52}$ (B) $\dfrac{1}{52}$ (C) $\dfrac{4}{13}$ (D) $\dfrac{2}{13}$ (E) NOTA

21. Express as a fraction: $.41\overline{6}$

    (A) $\dfrac{41}{90}$ (B) $\dfrac{25}{66}$ (C) $\dfrac{5}{12}$ (D) $\dfrac{103}{225}$ (E) NOTA

22. There are six tests in Jane's math class. She has averaged just 80 points on the first four. What must she average on the remaining tests to get an overall average of 90 points in the class?

    (A) 98   (B) 105   (C) 110   (D) 99   (E) NOTA

23. How many triangles are there in the figure below?
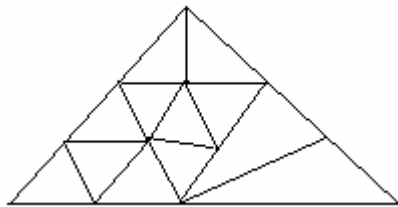
    (A) 17   (B) 15   (C) 19   (D) 18   (E) NOTA

24. What is 23_4 in base 3?

    (A) 112_3 (B) 102_3 (C) 32_3 (D) 11_3 (E) NOTA

25. Simplify: $\dfrac{\dfrac{3}{4}-\dfrac{3}{5}}{\dfrac{1}{6}-\dfrac{2}{3}}$

    (A) $-\dfrac{3}{10}$ (B) $-\dfrac{1}{3}$ (C) $-\dfrac{3}{4}$ (D) $-\dfrac{2}{3}$ (E) NOTA

26. Solve for x and y in the system of equations: $\begin{aligned} 2x+3y &= 13 \\ -2x+2y &= 12 \end{aligned}$

    (A) $\begin{aligned} x &= 0 \\ y &= 5 \end{aligned}$ (B) $\begin{aligned} x &= -1 \\ y &= 5 \end{aligned}$ (C) $\begin{aligned} x &= 5 \\ y &= -5 \end{aligned}$ (D) $\begin{aligned} x &= 5 \\ y &= -1 \end{aligned}$ (E) NOTA

27. What is the maximum value of $f(x)=4-3x^2+6x$?

    (A) 4   (B) 6   (C) 7   (D) 1   (E) NOTA

28. What is the equation of the line through the points (3,5) and (5,8)?

    (A) $3x-2y=-19$ (B) $-3x+2y=16$

    (C) $3x+2y=19$ (D) $-3x+2y=1$ (E) NOTA

29. If $r=2$ is a solution to $3r-qr^3+6=-4$, what is the value of q?

    (A) 4   (B) 2   (C) 1   (D) $\dfrac{1}{2}$ (E) NOTA

30. If $g(x)=3x+2$ and $f(x)=-2x+5$, what is $g(f(2))$?

    (A) 6   (B) 5   (C) 4   (D) –5   (E) NOTA

31. Simplify: $\sqrt{98}+\sqrt{27}+\sqrt{75}$

    (A) $15\sqrt{3}$ (B) $15\sqrt{2}$ (C) $8\sqrt{2}+7\sqrt{3}$ (D) $8\sqrt{2}$ (E) NOTA

32. Evaluate: $\sqrt{6\sqrt{6\sqrt{6\dots}}}$

   (A) $8\sqrt{2}$ (B) 6 (C) $2\sqrt{3}$ (D) 12 (E) NOTA

33. Express as an ordered triple the mode, mean, and median of the following data set:
   15, 5, 5, 9, 6, 5, 16, 20, 10, 6, 12, 2, 5,11,8

   (A) (5, 9, 8) (B) (10, 9, 9) (C) (5, 9, 10) (D) (6, 9, 5) (E) NOTA

34. Find the sum of the following arithmetic series: $(-100)+(-98)+(-96)+\cdots+(-2)$

   (A) –5050 (B) –5100 (C) -2500 (D) –2550 (E) NOTA

35. Lucy is two years older than Jake. In five years, Lucy will be four times Jake's age five years ago. How old is Lucy now?

   (A) 11 (B) 12 (C) 13 (D) 14 (E) NOTA

36. Samantha and Marlene work diligently on their math project (modeling paper airplanes) all through the week. Come Sunday evening, they realize they folded all the airplanes incorrectly. From the past week, they know that Samantha folds 45 planes in one hour and fifteen minutes, and that Marlene folds 60 planes in one hour and 30 minutes. How long will it take the two of them, working together, to fold the 225 planes needed for their project?

   (A) 2.85 hrs (B) 4hrs, 45 min
   (C) 2hrs, 15 minutes (D) 145 minutes (E) NOTA

37. Who invented the commonly-used rectangular coordinate system?

   (A) Euclid (B) Newton (C) Descartes (D) Einstein (E) NOTA

38. Which famous mathematician is argued to have been the inventor of Calculus, which Leibniz claimed that *he* invented around the same time?

   (A) Euclid (B) Newton (C) Descartes (D) Einstein (E) NOTA

39. What is the 5th term in the geometric series whose third term is $\dfrac{5}{32}$ and whose common ratio is $\dfrac{5}{8}$?

(A) $\dfrac{5}{48}$ (B) $\dfrac{625}{16384}$ (C) $\dfrac{25}{256}$ (D) $\dfrac{125}{2048}$ (E) NOTA

40. Suppose the Denver Broncos' Mile-High Stadium has 32,160 seats. Twenty percent of those seats belong to season ticket holders who came to every game, every year, twenty percent remain empty, and twenty-five percent of the remaining number of seats holds fans who buy tickets for each game, and the rest varies with each game. If the owners succeed in converting half of the fans who purchase tickets for each game into season ticket holders, how many season ticket holders will they have in the new season?

(A) 14,472 (B) 11,256 (C) 8,844 (D) 7,236 (E) NOTA