

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

- Evaluate  $(5 + 2^4) - 6 \div 2$ .  
(A) 10 (B) 7.5 (C) 18 (D) 26 (E) NOTA
- Meit's mom is making everyone roti! For those of you who do not know what a roti is, it's a type of Indian bread. Meit's mom plans on making her roti in perfect circles. If the height of the roti is negligible, what should the radius of the roti be in order for the area of the roti to be exactly 30 centimeters?  
(A)  $15\pi$  cm (B)  $\frac{15}{\pi}$  cm (C)  $\sqrt{\frac{30}{\pi}}$  cm (D)  $\sqrt{15\pi}$  cm (E) NOTA
- Where do the lines  $y = 3x + 5$  and  $5x + 5y = 25$  intersect?  
(A) (7, 6) (B) (5, 0) (C) (0, 5) (D) (4, 2) (E) NOTA
- What is the sum of the roots of the following equation?  
 $3x^2 - 24 = 6x$   
(A) -4 (B) -2 (C) 2 (D) 4 (E) NOTA
- Aditya and Kyle are both trying to get a girlfriend. The probability that a girl agrees to go on a date with Kyle is  $\frac{2}{7}$ . The probability that a girl agrees to go on a date with Aditya is  $\frac{9}{10}$ . Aditya and Kyle have low self-esteems, so they are going to ask out only one girl. Given that they both ask the same girl, what is the probability that the girl goes on a date with Kyle and that she goes on a date with Aditya?  
(A)  $\frac{83}{70}$  (B)  $\frac{9}{35}$  (C)  $\frac{13}{14}$  (D)  $\frac{11}{17}$  (E) NOTA
- Evaluate the following expression:  $1 + 3 + 5 + \dots + 35 + 37$ .  
(A) 361 (B) 362 (C) 324 (D) 323 (E) NOTA
- In how many distinct ways can the letters in the word ENTEI be arranged?  
(A) 360 (B) 240 (C) 120 (D) 60 (E) NOTA
- Jasmine is applying for a position in the Swag Squad and needs to find a pair of matching socks. Appearance means a lot in a job interview! Her dresser has three different types of socks: brown, green, and blue. There are 17 brown socks, 4 green socks, and 7 blue socks. Jasmine is going to randomly pick a sock without replacement. What is the minimum number of socks that she needs to pick, in order to guarantee that she has a matching pair?  
(A) 3 (B) 4 (C) 5 (D) 6 (E) NOTA
- Find the distance between the points (2, 3) and (10, 18).  
(A) 17 (B) 30 (C)  $2\sqrt{65}$  (D)  $\sqrt{161}$  (E) NOTA
- Let  $A$  = the ordinate of the y- intercept of the following line:  $3x + 4y = 16$ .  
Let  $B$  = the smaller of the two roots of the following quadratic:  $x + 2x^2 - 3 = 0$ .  
What is  $AB$ ?  
(A) -12 (B) -6 (C) 8 (D) 12 (E) NOTA
- It is known that  $x$  is directly proportional to  $y$  and inversely proportional to  $z$ . If  $x$  is 4 when  $y$  and  $z$  are 8 and 3 respectively, then what is  $x$  when  $y$  is 10 and  $z$  is 5?  
(A)  $\frac{4}{5}$  (B)  $\frac{12}{5}$  (C) 6 (D)  $\frac{16}{7}$  (E) NOTA

12. Shardul and Sitara are going to buy groceries at FoodMart. Shardul bought 4 jars of honey and 5 bananas, which cost him \$12.35. Sitara bought 6 jars of honey and 2 bananas, which cost her \$14.40. Assuming there's no tax, how much would it cost to buy 20 jars of honey and 14 bananas at FoodMart?
- (A) \$53.50                      (B) \$40.15                      (C) \$49.60                      (D) \$53.20                      (E) NOTA
13. Which of the following numbers are rational?
- I.  $e$                               II.  $\pi$                               III.  $\sqrt{2}$                               IV.  $\sqrt{3}$
- (A) I and II                      (B) III and IV                      (C) I, III, IV                      (D) II                              (E) NOTA
14. Let  $f(x) = 4x^2 - 24$ ,  $g(x) = 3x^2 - 2x$ , and  $h(x) = f(x) - g(x)$ . If  $h(x) = 0$ , then what is the largest possible integer value of  $x$ ?
- (A)  $-6$                               (B)  $6$                               (C)  $4$                               (D)  $-4$                               (E) NOTA
15. Solve for  $x$  when  $2^x = \sqrt{128}$ .
- (A)  $5$                               (B)  $\frac{5}{2}$                               (C)  $\frac{7}{2}$                               (D)  $7$                               (E) NOTA
16. Meit and Malik are playing Call of Duty: Black Ops 2, and they are winning against a bunch of people. In the game, 7 players can capture 7 points in 7 seconds. Assuming the rate is the same, how many seconds would it take 14 players to capture 14 points?
- (A)  $14$                               (B)  $21$                               (C)  $7$                               (D)  $10.5$                               (E) NOTA
17. Given the following functions:
- $f(x) = 3x - 5$                        $g(x) = x^2 + 5$                        $h(x) = 7 - x$
- What is  $f(g(h(4)))$ ?
- (A)  $28$                               (B)  $37$                               (C)  $373$                               (D)  $-47$                               (E) NOTA
18. Solve for  $x$  in the following equation:  $4x + 5 = 2x - 3$ .
- (A)  $-4$                               (B)  $\frac{-4}{3}$                               (C)  $1$                               (D)  $5$                               (E) NOTA
19. Expand  $(x + 2)^3$ .
- (A)  $x^3 + 2x^2 + 8x + 16$       (B)  $x^3 + 2x^2 + 4x + 16$       (C)  $x^3 + 6x^2 + 12x + 8$       (D)  $2x^3 + 4x^2 + x + 16$       (E) NOTA
20. Find the sum of all integers that fit the following inequality:  $|x + 4| < 10$ .
- (A)  $-76$                               (B)  $-80$                               (C)  $76$                               (D)  $80$                               (E) NOTA
21. Evaluate the following expression:  $\sqrt{6 + \sqrt{6 + \sqrt{6 + \dots}}}$
- (A)  $-2$                               (B)  $-2, 3$                               (C)  $3$                               (D)  $4$                               (E) NOTA
22. The length of a rectangle is 2 less than 3 times the width. The area of the rectangle is 40. What is the sum of the length and width?
- (A)  $11$                               (B)  $22$                               (C)  $13$                               (D)  $14$                               (E) NOTA

23. Saniya is finally hitting her growth spurt! Each day her height doubles and then shrinks 4 inches. After her growth spurt on the first day, she was 20 inches tall. On which day will she be 260 inches tall?
- (A) 2                      (B) 3                      (C) 4                      (D) 5                      (E) NOTA
24.  $A @ B = B^2 - AB$ .  
What is  $-4 @ \sqrt{6}$ ?
- (A)  $6 - 4\sqrt{6}$                       (B)  $4\sqrt{6} + 6$                       (C)  $6\sqrt{4} - 4$                       (D)  $-4 - \sqrt{6}$                       (E) NOTA
25. If  $x + y = 14$ , and  $xy = 72$ , then what is  $x^2 + y^2$ ?
- (A) 52                      (B) 65                      (C) 83                      (D) 142                      (E) NOTA
26. What is the degree of the following polynomial?  
 $4^6 + 7x^3y - 2y + 16x^2$
- (A) 16                      (B) 6                      (C) 2                      (D) 4                      (E) NOTA
27. Which property of equality states “If  $A = B$ , then  $B = A$ ”?
- (A) Reflexive                      (B) Symmetric                      (C) Transitive                      (D) Commutative                      (E) NOTA
28. Roehl and Zack are interested in people’s taste in gaming consoles. They conduct a survey and ask 52 random students which consoles they like. The students have three choices: PC, Xbox One, and PS4. 11 students like both PS4 and PC. 16 students like both Xbox One and PC. 9 students like both PS4 and Xbox One. 17 students like only Xbox One, 10 students like only PS4, and 1 student likes only PC. A total of 24 students like PS4, a total of 36 students like Xbox One, and a total of 22 students like PC. How many students like all three consoles?
- (A) 3                      (B) 4                      (C) 5                      (D) 6                      (E) NOTA
29. Sarah, Lisa, Rida, and Wenxin are sitting around a circular table doing a team round. How many distinct seating arrangements are there?
- (A) 3                      (B) 4                      (C) 5                      (D) 6                      (E) NOTA
30.  $\pi$  is one of the most important numbers in math.  $\pi$  is the ratio of a circle’s circumference to its diameter. Using this number, you can find the area and circumference of circles, as well as the volume of many geometric figures. How many digits does  $\pi$  have?
- (A) 3                      (B) 50                      (C) 100                      (D) 200                      (E) NOTA