1. Which of the following linear equations shares a solution with the quadratic equation $x^2 - 15x - 54 = 0$?

A. 6x + 15 = 3x - 3 B. 6x - 15 = 3x + 3 C. 6x + 15 = 5x - 3 D. 6x - 15 = 4x + 3 E. 6x + 15 = 2x + 3

2. The supplement of a nonzero angle is k times the angle's complement. If k is a positive integer, what is its smallest possible value?

A. 2 B. 3 C. 4 D. 5 E. 6

3. In quadrilateral PQRS, PS = PQ = 1, $\angle S = \angle Q = 90^{\circ}$, and PR = 2. Find SQ.

A. $\frac{\sqrt{2}}{2}$ B. $\frac{\sqrt{3}}{2}$ C. $\sqrt{2}$ D. $\sqrt{3}$ E. 2

4. Which of the following is closest to $\log_{16} 0.002$?

A. -0.5 B. -1.0 C. -1.5 D. -2.0 E. -2.5

5. Two highways, one 50 ft wide, the other 60 ft wide, meet at a 60° angle. Which of the following is closest to the area in sq ft of the intersection they form?

A. 2600 B. 2800 C. 3000 D. 3200 E. 3400

6. A puppy and two kittens weigh a total of 12 lb. The puppy and larger kitten weigh exactly twice the smaller kitten. The puppy and smaller kitten weigh exactly the same as the larger kitten. What is the puppy's weight?

A. 2 lb B. 3 lb C. 4 lb D. 5 lb E. 6 lb

7. Four numbers have a sum of 45. If 2 is added to the first, subtracted from the second, multiplied by the third and divided into the fourth, the results are equal. Find the product of the four numbers.

A. 9200 B. 9600 C. 10000 D. 12000 E. 14400

8. A palindrome is a word or numeral which reads the same forwards and backwards, such as RADAR, A, 5, 88, or the current year 2002. How many of 2002's positive integer factors besides itself are palindromes?

A. 4 B. 5 C. 6 D. 7 E. 8

9. A small circle of radius a lies completely inside a larger circle of radius b without touching. The distance between the centers is d. What is the length of the shortest line segment joining a point on the smaller circle to a point on the larger circle?

A. b-a B. b-d-a C. b-d-2a D. $\frac{(a+b)}{2}$ E. $\frac{(b-a)}{2}$

10. What is the smallest element of the set $\{2^{3000}3^{1000}, 2^{2000}7^{1000}, 2^{5000}, 3^{3000}, 5^{2000}\}$?

A. 2³⁰⁰⁰3¹⁰⁰⁰ B. 2²⁰⁰⁰7¹⁰⁰⁰ C. 2⁵⁰⁰⁰ D. 3³⁰⁰⁰ E. 5²⁰⁰⁰

11. What is the smallest positive integer n for which n! terminates in exactly 88 zeros?

11. What is the smallest positive integer if for which it: terminates in exactly 66 zeros?

A. 350 B. 354 C. 360 D. 370 E. 440

| 12. | One day a store brought in \$4400 by selling 60 items of clothing consisting of pants for \$30, jackets for \$80, and suits for \$120. What is the largest number of suits the store could have sold? | | | | | | | | | | | | | | | | | | | | | | | |
|-----|---|---|-------|---------|-------|---------|---------|-------|--------|--------|----------|--------|-------|------|-------------|-------------|-------|-------|---------|---------|------------------------|--|--|--|
| | A. | 25 | B. | 28 | | C. 2 | 29 | | D. | 30 | | E. | 36 | | | | | | | | | | | |
| 13. | Но | w many s | olut | ions c | does | the e | quati | on c | os 3 | х сс | s x = s | in 3x | sin | x h | ave | in the | inte | erval | [-8π,8 | Βπ]? | | | | |
| | A. | 0 | | B. | 16 | | | C. | 64 | | | D. | 250 | 6 | | | E. | an | infinit | e num | ber | | | |
| 14. | | ight triangue of K in | | | | | | | | | | | | | | | | | | | | | | |
| | A. | 20 | | В. | | 22 | | | C. | | 24 | | | D. | | 25 | | | E. 3 | 0 | | | | |
| 15. | | at is the la | | | | | | e sm | alle | st nu | ımber v | whic | h is | divi | sible | by 7 | and | yiel | ds a re | maind | er of 1 | | | |
| | A. | 11 | | В. | | 19 | | | C. | | 37 | | | D. | | 43 | | | E. | 61 | | | | |
| 16. | For | how man | ıy se | quen | ces c | of thre | e dec | cima | ıl dig | gits i | s each | digit | at le | east | as la | arge as | s the | e pre | ceding | digit? | | | | |
| | A. | 120 | | B. | 130 |) | C. | 20 | О | | D. 21 | 0 | | E. | 22 0 | | | | | | | | | |
| 17. | diff | Let each letter in the equation AMA - TYC = B represent a digit from 0 to 9, with different letters representing different digits, so that the left side of the equation represents the difference of two three-digit numbers. In how many ways can the letters be replaced to produce a true equation? | | | | | | | | | | | | | | | | | | | | | | |
| | A. | 5 | | B. | B. 10 | | | C. 12 | | | | D. 13 | | | | E. 15 | | | | | | | | |
| 18. | | ectangle (n rectangl | | | | 32 an | d DE | £ = 2 | 4, aı | nd ir | n rectar | igle : | DFC | ЭH, | FG | = 12. | The | e are | a of th | e regio | on inside | | | |
| | A. | 150 | | В. | | 330 | | | C. | | 438 | | | D. | , | 48 0 | | | E. | 630 | | | | |
| 19. | one | o 20-foot fence wit and the fe | th a? | 20-ft i | rope | . Wh | at is 1 | the a | area | to th | | | | | | | | | | | one end of t can go | | | |
| | Α. | 1020 | | B. | | 1120 | | | C. | | 1150 | | | D. | | 1200 | | | E. | 122 | 0 | | | |
| 20. | box | box holds 9 identical balls labeled 1 through 9. A ball is drawn at random from the box, returned to ox, and then a second ball is drawn at random. For what value of k will the events "the sum of the twumbers is k" and "the two numbers are different" be independent? | | | | | | | | | | | | | | | | | | | | | | |
| | Α. | 6 B | | 7 | | C. | 8 | | D. | | 9 | E. | | 10 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
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