

1. Let  $a > 0$  and  $(x+1)(x+2)(x+3)(x+4)+1 = (ax^2 + bx+c)^2$ . The ordered triple  $(a, b, c)$  is

(a) (1,5,5)

(c) (1,2,2)

(b) (2,6,6)

(d) (3,4,4)

2. If ten players participate in a tennis tournament in which each player plays every other player exactly once. After each match, the two players shake hands. Then, both players shake hands with the umpire. After all of the matches, how many handshakes have been exchanged?

(a) 155

(c) 187

(b) 135

(d) 891

3. Find the number of ways in which the letters of the word NUMBER can be scrambled so that the first and the last letters are both vowels.

(a) 24

(c) 26

(b) 55

(d) 48

4. A chord of the larger circle of two concentric circles is tangent to the smaller (inner) circle and measures 14 inches. The number of square inches in the area outside the smaller circle and inside the larger circle can be expressed as  $x\pi$ . Find  $x$ .

(a) 68

(c) 49

(b) 70

(d) 71

5. Find the probability that the two consecutive integers  $x$  &  $y$  such that

$$x < y \leq 100 \text{ satisfy } x \times y \leq 100$$

(a)  $1/11$

(c)  $6/11$

(b)  $2/11$

(d)  $8/11$

6. Let " $x$ " be an integer that 4,320,000 must be multiplied by to get a number with exactly eight terminating zeroes. Find the value of " $x$ ".

(a) 615

(c) 625

(b) 635

(d) 645

7. When two fair dice are rolled, find the probability that the product of the numbers on the top faces will be greater than 6. Express your answer as a common fraction in lowest terms.

(a) 11/18

(c) 19/18

(b) 12/18

(d) 22/18

8. Let  $p(x) = x^2$ ,  $q(x) = 2x$ ,  $r(x) = p[q(x)] - q[p(x)]$ . What is the value of  $r(10)$ ?

(a) 500

(c) 200

(b) 400

(d) 600

9. What is the value of "x" which satisfies the below expression

$$\frac{x^3 - x^2 - x + 1}{x^3 - x^2 + x - 1} = 0$$

(a) -5

(c) -2

(b) -4

(d) -1

10. An integer is represented by a two-digit base 10 numeral. If three times the sum of its digits is added to the integer, the result is the original integer with its digits reversed. For example,  $12 + 3(1 + 2) = 21$ . Including 12, how many such positive integers exist?

(a) 5

(c) 3

(b) 4

(d) 2

11. PQRS is a square of side length 12 units. Let A, B, C and D be the midpoints of PQ, QR, RS and SP respectively. What is the number of square units in the area of the triangle QDC?

(a) 52

(c) 53

(b) 51

(d) 54

12. When the obtuse angle of an isosceles triangle is bisected, each resulting angle is 59 degrees larger than a base angle. How many degrees are in the measure of the obtuse angle?

(a) 189

(c) 149

(b) 549

(d) 349

13. On planet Holbrook, there are as many days in a week as there are weeks in a month. The number of months in a Holbrook year is twice the number of days in a month. If there are 1250 days in a Holbrook year, how many months are there?

(a) 60

(c) 70

(b) 50

(d) 20

14. McCain has a container holding 60 quarts of mixtures of 30% NaCl and 70% H<sub>2</sub>O. McCain has a second container holding 40 quarts of mixtures of 50% NaCl and 50% H<sub>2</sub>O. If he mixes them, what percent, to the nearest whole percent, the mixture will be NaCl?

(a) 38

(c) 55

(b) 45

(d) 25

15. Peterson wants to sell all of her 60 pencils in combinations of 5 or 3 or both. In how many ways can the pencils be grouped?

(a) 2

(c) 5

(b) 7

(d) 8

16. Define a 3-digit number  $n$  to be a multiple number if the hundreds digit is the product of the tens and ones digit. The number 632 is a multiple number since  $6 = 3 \times 2$ . How many three-digit multiple numbers less than 500 exist?

(a) 5

(c) 6

(b) 7

(d) 8

17. If  $81^p = 3$  and  $p^q = 16$ , then the value of  $pq$  is

(a)  $-1/2$

(c)  $-2$

(b)  $-2/3$

(d)  $-3$

18. If each person in a science class shakes hands with each of the others exactly once, and 120 handshakes are exchanged altogether, then the number of people in the class are?

(a) 12

(c) 13

(b) 14

(d) 16

19. Let the prime factorization of  $6!$  be  $2^a \times 3^b \times 5^c$ . What is the value of  $a+b+c$  ?

(a) 2

(c) 5

(b) 3

(d) 7

20. If a point  $A$  is chosen inside the square  $PQRS$ , what is the probability that the angle  $PAQ$  is obtuse? Express your answer as a decimal to the nearest hundredths.

(a) 0.29

(c) 0.49

(b) 0.39

(d) 0.59

21. The lengths of the sides of a triangle are 3, 4, and 6. What is the least possible perimeter of a similar triangle, one of whose sides has a length of 12?

(a) 16

(c) 26

(b) 22

(d) 20

22. Lily selects 2 numbers at random from 1 to 8. She can choose the same number twice. Find the probability that the sum of two numbers selected is 5?

(a)  $\frac{1}{2}$

(c)  $\frac{2}{15}$

(b)  $\frac{1}{16}$

(d)  $\frac{3}{16}$

23. ABC is a right angled triangle. D is the point on the hypotenuse such that  $CB=BD$ . If angle B = 40 degrees, then the angle of C is

(a) 60

(c) 20

(b) 80

(d) none of these

24. Angelina decided to start saving money at age 8 from her allowance. She saved \$2 a month the first year, \$3 a month the second year, \$4 a month the third year, etc. She is turning 18 today. How much money has she saved so far?

(a) 225

(c) 135

(b) 335

(d) 780



25. It takes Kevin 40 minutes to walk between her home and her school. One morning he walked half way to school and remembered that he had left his calculator at home. He ran home. It took 5 minutes to find his calculator when he got home. Then he ran all the way to school. He runs twice as fast as He walks. How many minutes more than usual did it take for him to get to school??

(a) 15

(c) 14

(b) 17

(d) 24

26. If  $7 \leq x \leq 12$ , then, what is the value of

$$||x - 3| + |x - 24||$$

(a) 27

(c) 21

(b) 8

(d) 6

27. In a physical education class, the girls start around a large circle and spaced themselves evenly. To form teams, the instructor asked them to count off 1, 2, 3, 4,..... When they were finished counting, the girl who was 21st was sitting directly across from the girl who was 7th. How many girls were sitting around the circle?

(a) 28

(c) 18

(b) 20

(d) 30

28. If  $5p + 7q = 9$  and  $7p + 5q = 63$ , then the value of  $p + q$  is

(a) 2

(c) 6

(b) 5

(d) 9

29. Find the least number of people you could have in a group and still be guaranteed that at least 7 of them have birthdays in the same month.

(a) 63

(c) 53

(b) 15

(d) 73

30. You would like to buy a laptop. The IBM laptop costs \$1500 with an immediate 10% discount. You can also later cash a \$100 rebate for the IBM laptop. On the other hand, the Toshiba laptop costs \$1600 with a 25% discount, but no rebate. Assume that you live in a sales-tax-free nation. What is the price of the cheaper laptop?

(a) 1800

(c) 1400

(b) 1600

(d) 1200

31. If the sum of 4 consecutive odd numbers is 216, then the smallest of these numbers is

(a) 51

(c) 45

(b) 36

(d) 60

32. Find the 100<sup>th</sup> term in the arithmetic sequence 1, 4, 7, 10, 13,.....?

(a) 240

(c) 298

(b) 264

(d) 250

33. There are two passenger trains traveling in opposite directions meet and pass each other. Each train is  $\frac{1}{24}$  miles long and is traveling at 50 miles per hour. How many seconds after the front parts of the trains meet will their rear parts pass each other?

- (a) 3 (c) 2  
(b) 4 (d) 9

34. After having read Shakespeare, Ronald decides to speak in iambic pentameter. This means that he speaks in lines with 5 sets of 2 syllables each. Watson interrupts him after he has spoken 13 lines and 70% of his 14th line. How many syllables has he said?

- (a) 187 (c) 157  
(b) 137 (d) 167

35. It was found that A club could achieve a ratio of 2 adult members for every minor member either by inducting 24 adults or by expelling  $x$  minors. Find  $x$ .

- (a) 12 (c) 23  
(b) 16 (d) 26

36. Blocks of molding clay are 9 inches by 6 inches by 3 inches. How many whole blocks are needed to mold a cylindrical sculpture 13 inches high and 6 inches in diameter?

(a) 7

(c) 3

(b) 4

(d) 1

37. Nine teams are participating in a school district competition. Each team play each other team once. What is the total number of games played in the competition?

(a) 28

(c) 12

(b) 30

(d) 36

38. 55% of "x" is 935, what is 70% of "x"?

(a) 1900

(c) 1410

(b) 1190

(d) 1500

39. Twenty of Ben's men can beat a dragon in battle. If there are 170 Ben's men, how many dragons could they beat in battle?

(a) 3

(c) 1

(b) 2

(d) 8

40. While riding bicycles, A and B leave from two different places at the same time and ride directly toward each other. A rides at 10 mi/h and B rides at 8 mi/h. If they meet after 40 minutes of riding, how far away were they at the beginning?

(a) 14

(c) 32

(b) 12

(d) 22

41. What is the sum of the numbers from 1 to 15 (inclusive)?

(a) 120

(c) 122

(b) 121

(d) 123

42. James has 100 feet of fencing. He will use the fencing to enclose a rectangular play area for his puppy. What is the maximum number of square feet he can enclose?

(a) 643

(c) 625

(b) 342

(d) 340

43. It takes David on average 45 minutes to paint a fence. It takes Taylor on average 30 minutes to paint the same fence. If David and Taylor worked together to paint the fence, how many minutes would it take them to finish?

(a) 7

(c) 6

(b) 14

(d) 18

44. Donald would be able to mow a lawn that measures 600 square yards in 1.5 hours. At this rate, how many minutes would it take him to mow a lawn that measures 600 square feet?

(a) 29

(c) 31

(b) 10

(d) 32

45. A fish can drink one cubic yard of water in exactly 30 minutes. How many minutes would it take the fish to drink 36 cubic feet of water?

(a) 40

(c) 45

(b) 48

(d) None of these

46. Find the value of  $|4 - 7| + |7 - 4|$

(a) 5

(c) 2

(b) 6

(d) 3

47. If  $f(x)$  is defined as  $5x+20$  for every real value of "x", then the value of  $f(3) + f(5)$  is

(a) 42

(c) 36

(b) 80

(d) 48



48. Find the area of a triangle with base 7 and height 4?

(a) 16

(c) 14

(b) 15

(d) 12

49. John has to compile 250 questions for a math competition. Since he is a procrastinator, he hasn't started yet. If he has 10 days left, how many questions must he write per day to complete the competition in time?

(a) 25

(c) 15

(b) 35

(d) 45

50. What is the value of  $25!/24!$ ?

(a) 35

(c) 55

(b) 25

(d) 65

Answers

- |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|
| 1. a  | 2. b  | 3. d  | 4. c  | 5. a  | 6. c  |
| 7. a  | 8. c  | 9. d  | 10. b | 11. d | 12. c |
| 13. b | 14. a | 15. c | 16. d | 17. a | 18. d |
| 19. d | 20. b | 21. c | 22. b | 23. c | 24. d |
| 25. a | 26. c | 27. a | 28. c | 29. d | 30. d |
| 31. a | 32. c | 33. a | 34. b | 35. a | 36. c |
| 37. d | 38. b | 39. d | 40. b | 41. a | 42. c |
| 43. d | 44. b | 45. a | 46. b | 47. b | 48. c |
| 49. a | 50. b |       |       |       |       |