

1. What is the sum of all integers from 1 to 20?

- (A) 200 (B) 205
(C) 210 (D) 215
(E) 220

2. If $3x = 24$, what is x ?

- (A) 6 (B) 7
(C) 8 (D) 9
(E) 10

3. A square has side length 5. What is its area?

- (A) 10 (B) 15
(C) 20 (D) 25
(E) 30

4. In how many ways can 3 distinct books be arranged on a shelf?

- (A) 3 (B) 6
(C) 9 (D) 12
(E) 15

5. What is the average of 2, 4, and 6?

- (A) 3 (B) 4
(C) 5 (D) 6
(E) 7

6. What is the largest prime number less than 20?

- (A) 17 (B) 18
(C) 19 (D) 20
(E) 21

7. If $2x + 3 = 11$, what is x ?

- (A) 2 (B) 3
(C) 4 (D) 5
(E) 6

8. A rectangle has length 6 and width 4. What is its perimeter?

- (A) 10 (B) 16
(C) 20 (D) 24
(E) 28

9. A coin is flipped twice. In how many outcomes is there at least one head?

- (A) 1 (B) 2
(C) 3 (D) 4
(E) 5

10. What is the median of 1, 3, 5, 7, 9?

- (A) 3 (B) 5
(C) 6 (D) 7
(E) 9

11. What is the greatest common factor of 12 and 18?

- (A) 2 (B) 3
(C) 6 (D) 9
(E) 12

12. If $5x - 2 = 18$, what is x ?

- (A) 3 (B) 4
(C) 5 (D) 6
(E) 7

13. A triangle has angles 50° and 60° . What is the third angle?

- (A) 60° (B) 65°
(C) 70° (D) 75°
(E) 80°

14. How many ways can you choose 2 people from a group of 4?

- (A) 4 (B) 5
(C) 6 (D) 7
(E) 8

15. What is the mode of 2, 2, 3, 4, 4, 4?

- (A) 2 (B) 3
(C) 4 (D) 5
(E) 6

16. What is the least common multiple of 4 and 6?

- (A) 8 (B) 10
(C) 12 (D) 14
(E) 24

17. If $x/3 = 9$, what is x ?

- (A) 21 (B) 24
(C) 27 (D) 30
(E) 33

18. A circle has radius 3. What is its circumference, in terms of π ?

- (A) 3π (B) 6π
(C) 9π (D) 12π
(E) 18π

19. How many even numbers are there from 1 to 20, inclusive?

- (A) 8 (B) 9
(C) 10 (D) 11
(E) 12

20. What is the range of the data set 4, 9, 15, 2?

- (A) 11 (B) 12
(C) 13 (D) 14
(E) 15

21. What is the sum of the digits of 4567?

- (A) 19 (B) 20
(C) 21 (D) 22
(E) 23

22. If $3(x - 2) = 15$, what is x ?

- (A) 5 (B) 6
(C) 7 (D) 8
(E) 9

23. A trapezoid has bases 5 and 9 and height 4. What is its area?

- (A) 24 (B) 26
(C) 28 (D) 30
(E) 32

24. In how many distinct ways can 5 people be seated around a round table?

- (A) 24 (B) 60
(C) 120 (D) 20
(E) 12

25. The average of 5 numbers is 12. What is their sum?

- (A) 50 (B) 55
(C) 60 (D) 65
(E) 70

26. How many positive factors does 28 have?

- (A) 4 (B) 5
(C) 6 (D) 7
(E) 8

27. If $2^x = 32$, what is x ?

- (A) 3 (B) 4
(C) 5 (D) 6
(E) 7

28. A right triangle has legs 3 and 4. What is its hypotenuse?

- (A) 5 (B) 6
(C) 7 (D) 8
(E) 9

29. A fair die is rolled once. What is the probability of rolling an even number?

- (A) $1/6$ (B) $1/3$
(C) $1/2$ (D) $2/3$
(E) $5/6$

30. A student's first 3 tests average 85. The 4th test score is 93. What is the new average?

- (A) 86 (B) 87
(C) 88 (D) 89
(E) 90

31. What is the remainder when 47 is divided by 6?

- (A) 1 (B) 2
(C) 3 (D) 4
(E) 5

32. Solve for x : $4x + 5 = 2x + 17$.

- (A) 4 (B) 5
(C) 6 (D) 7
(E) 8

33. What is the measure of each interior angle of a regular hexagon?

- (A) 90° (B) 100°
(C) 108° (D) 120°
(E) 135°

34. How many diagonals does a hexagon have?

- (A) 6 (B) 7
(C) 8 (D) 9
(E) 10

35. A class has 10 students who scored 80 and 10 who scored 90. What is the overall average?

- (A) 80 (B) 82
(C) 85 (D) 87
(E) 90

36. What is the smallest positive integer divisible by 2, 3, and 5?

- (A) 10 (B) 15
(C) 20 (D) 30
(E) 60

37. If $(x+3)(x-3) = 16$, what is a positive value of x ?

- (A) 3 (B) 4
(C) 5 (D) 6
(E) 7

38. A circle has radius 5. What is its area, in terms of π ?

- (A) 5π (B) 10π
(C) 20π (D) 25π
(E) 30π

39. From 6 people, a captain and a vice-captain are chosen (order matters). How many ways?

- (A) 15 (B) 20
(C) 25 (D) 30
(E) 36

40. What is the median of 2, 4, 4, 6, 8, 10?

- (A) 4 (B) 4.5
(C) 5 (D) 5.5
(E) 6

41. How many positive divisors does 100 have?

- (A) 6 (B) 7
(C) 8 (D) 9
(E) 10

42. For $x^2 - 5x + 6 = 0$, what is the sum of the roots?

- (A) 3 (B) 4
(C) 5 (D) 6
(E) 7

43. An isosceles triangle has base 12 and equal legs of length 10. What is its area?

- (A) 42 (B) 44
(C) 46 (D) 48
(E) 50

44. How many 4-digit numbers can be formed using digits 1,2,3,4 exactly once each?

- (A) 12 (B) 16
(C) 20 (D) 24
(E) 28

45. A car travels 60 mph for 1 hour, then 40 mph for 2 hours. What is its average speed for the whole trip?

- (A) 45 (B) 46
(C) 46.67 (D) 47
(E) 50

46. What is the sum of the first five prime numbers?

- (A) 26 (B) 27
(C) 28 (D) 29
(E) 30

47. If $3^{x+1} = 81$, what is x ?

- (A) 2 (B) 3
(C) 4 (D) 5
(E) 6

48. A square is inscribed in a circle of radius $\sqrt{2}$. What is the square's side length?

- (A) 1 (B) $\sqrt{2}$
(C) 2 (D) $2\sqrt{2}$
(E) 4

49. How many distinct arrangements are there of the letters in MATH?

- (A) 12 (B) 16
(C) 20 (D) 24
(E) 28

50. Six numbers have an average of 10. One number is removed, and the average of the remaining five is 9. What number was removed?

- (A) 10 (B) 12
(C) 13 (D) 15
(E) 18

51. What is $17 \bmod 5$ (the remainder when 17 is divided by 5)?

- (A) 0 (B) 1
(C) 2 (D) 3
(E) 4

52. Solve the system $x+y=10$ and $x-y=4$. What is xy ?

- (A) 18 (B) 20
(C) 21 (D) 24
(E) 28

53. An equilateral triangle has side length 6. What is its area?

- (A) $6\sqrt{3}$ (B) $9\sqrt{3}$
(C) $12\sqrt{3}$ (D) $18\sqrt{3}$
(E) $36\sqrt{3}$

54. Two fair dice are rolled. What is the probability their sum is 7?

- (A) $1/12$ (B) $1/9$
(C) $1/6$ (D) $1/4$
(E) $1/3$

55. What is the mean of 1, 2, 3, 4, and 100?

- (A) 18 (B) 20
(C) 21 (D) 22
(E) 24

56. What is the largest power of 2 that divides 48?

- (A) 2 (B) 3
(C) 4 (D) 5
(E) 6

57. If $f(x) = 2x^2 - 3$, what is $f(3)$?

- (A) 12 (B) 13
(C) 14 (D) 15
(E) 16

58. A cube has side length 3. What is its volume?

- (A) 9 (B) 18
(C) 27 (D) 36
(E) 54

59. From 5 distinct flavors, how many ways can you choose 3 (order doesn't matter)?

- (A) 5 (B) 8
(C) 10 (D) 12
(E) 15

60. A class of 20 students has 12 boys and 8 girls. What is the probability a randomly chosen student is a girl?

- (A) $1/4$ (B) $1/3$
(C) $2/5$ (D) $1/2$
(E) $3/5$

61. How many integers from 1 to 100 are divisible by 3 or 5?

- (A) 43 (B) 45
(C) 47 (D) 49
(E) 51

62. For $x^2 - 7x + 12 = 0$, what is the larger root?

- (A) 2 (B) 3
(C) 4 (D) 5
(E) 6

63. What is the measure of each interior angle of a regular pentagon?

- (A) 100° (B) 104°
(C) 108° (D) 112°
(E) 120°

64. Four married couples (8 people) sit around a round table, each couple seated together. How many seatings are possible?

- (A) 48 (B) 72
(C) 96 (D) 120
(E) 144

65. What is the average of the first 20 positive integers?

- (A) 9.5 (B) 10
(C) 10.5 (D) 11
(E) 11.5

66. What is the sum of the digits of 2^{10} ?

- (A) 5 (B) 6
(C) 7 (D) 8
(E) 9

67. If $x + 1/x = 3$, what is $x^2 + 1/x^2$?

- (A) 5 (B) 6
(C) 7 (D) 8
(E) 9

68. A rectangle has a diagonal of length 13 and one side of length 5. What is the other side?

- (A) 10 (B) 11
(C) 12 (D) 13
(E) 14

69. A coin is flipped 3 times. What is the probability of getting exactly 2 heads?

- (A) $1/8$ (B) $1/4$
(C) $3/8$ (D) $1/2$
(E) $5/8$

70. Four numbers average 15. If one of them is 25, what is the average of the remaining three?

- (A) 10 (B) 11
(C) 11.67 (D) 12
(E) 13

71. What is the smallest n such that $n!$ is divisible by $1000 = 2^3 \cdot 5^3$?

- (A) 10 (B) 12
(C) 15 (D) 20
(E) 25

72. Solve $|2x - 4| = 6$. What is the sum of all solutions?

- (A) 2 (B) 3
(C) 4 (D) 5
(E) 6

73. A circle is inscribed in a square of side 8. What is the area between the square and the circle, in terms of π ?

- (A) $64 - 8\pi$ (B) $64 - 16\pi$
(C) $32 - 16\pi$ (D) $64 - 4\pi$
(E) $16 - 16\pi$

74. How many 3-digit numbers have all distinct digits?

- (A) 504 (B) 576
(C) 648 (D) 720
(E) 810

75. A data set of 5 values has mean 10. One value changes from 8 to 18. What is the new mean?

- (A) 10 (B) 11
(C) 12 (D) 13
(E) 14

76. What is the units digit of 7^{100} ?

- (A) 1 (B) 3
(C) 7 (D) 9
(E) 0

77. Solve $2^{2x} = 64$. What is x ?

- (A) 2 (B) 2.5
(C) 3 (D) 3.5
(E) 4

78. A 10-foot ladder leans against a wall with its base 6 feet from the wall. How high up the wall does it reach?

- (A) 6 (B) 7
(C) 8 (D) 9
(E) 10

79. Three regions of a map are mutually adjacent and must be colored with 4 available colors so adjacent regions differ. How many colorings?

- (A) 12 (B) 16
(C) 20 (D) 24
(E) 28

80. In a survey of 50 people, 60% prefer option A. How many people is that?

- (A) 25 (B) 28
(C) 30 (D) 32
(E) 35

81. How many positive divisors does $2^3 \cdot 3^2 \cdot 5$ have?
 (A) 18 (B) 20
 (C) 22 (D) 24
 (E) 26
82. Positive integers x and y satisfy $xy = 24$ and $x + y = 11$, with $x > y$. What is $x - y$?
 (A) 3 (B) 4
 (C) 5 (D) 6
 (E) 7
83. A right triangle has legs 9 and 12. What is the length of the altitude drawn to the hypotenuse?
 (A) 6 (B) 6.5
 (C) 7 (D) 7.2
 (E) 8
84. In how many ways can 5 identical candies be given to 3 children, with any child possibly receiving none?
 (A) 15 (B) 18
 (C) 21 (D) 24
 (E) 28
85. Seven numbers have a mean of 20. Four of them have a mean of 15. What is the mean of the remaining three?
 (A) 24 (B) 25
 (C) 26 (D) 26.67
 (E) 28
86. What is the remainder when 2^{10} is divided by 7?
 (A) 1 (B) 2
 (C) 3 (D) 4
 (E) 5
87. Solve the system $2x + 3y = 12$ and $x - y = 1$. What is $x + y$?
 (A) 3 (B) 4
 (C) 5 (D) 6
 (E) 7
88. A circle has area 36π . What is its circumference?
 (A) 6π (B) 9π
 (C) 12π (D) 18π
 (E) 24π
89. How many distinct arrangements are there of the letters in LEVEL (L,L,E,E,V)?
 (A) 20 (B) 24
 (C) 30 (D) 36
 (E) 40
90. A set of 5 distinct positive integers has mean 10 and median 10. What is the minimum possible value of the largest number?
 (A) 11 (B) 12
 (C) 13 (D) 14
 (E) 15
91. How many integers from 1 to 200 are perfect squares or perfect cubes, but not both?
 (A) 13 (B) 14
 (C) 15 (D) 16
 (E) 17
92. What is the sum of all integers x satisfying $x^2 < 50$?
 (A) -7 (B) 0
 (C) 7 (D) 14
 (E) 49
93. A square and an equilateral triangle have equal perimeters of 24. What is the ratio of the triangle's area to the square's area?
 (A) $\sqrt{3}/3$ (B) $4\sqrt{3}/9$
 (C) $2\sqrt{3}/3$ (D) $\sqrt{3}$
 (E) $4\sqrt{3}/3$
94. In how many ways can 6 people be divided into two (unlabeled) groups of 3?
 (A) 6 (B) 8
 (C) 10 (D) 15
 (E) 20
95. The average of n consecutive integers starting at 5 is 12. What is n ?
 (A) 12 (B) 13
 (C) 14 (D) 15
 (E) 16
96. What is the smallest positive integer with exactly 10 positive divisors?
 (A) 36 (B) 40
 (C) 48 (D) 60
 (E) 72
97. If a and b are the roots of $x^2 - 6x + 8 = 0$, what is $a^3 + b^3$?
 (A) 64 (B) 68
 (C) 72 (D) 76
 (E) 80
98. A right circular cylinder has radius 3 and height 10. What is its total surface area, in terms of π ?
 (A) 60π (B) 66π
 (C) 72π (D) 78π
 (E) 84π
99. Four distinct prizes are awarded to 4 students, one each. In how many ways can this happen if one particular student does NOT receive the grand prize?
 (A) 6 (B) 12
 (C) 16 (D) 18
 (E) 20
100. The product of three consecutive positive integers is 990. What is their sum?
 (A) 27 (B) 28
 (C) 29 (D) 30
 (E) 31

Answer Key

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2. C	22. C	42. C	62. C	82. C
3. D	23. C	43. D	63. C	83. D
4. B	24. A	44. D	64. C	84. C
5. B	25. C	45. C	65. C	85. D
6. C	26. C	46. C	66. C	86. B
7. C	27. C	47. B	67. C	87. C
8. C	28. A	48. C	68. C	88. C
9. C	29. C	49. D	69. C	89. C
10. B	30. B	50. D	70. C	90. B
11. C	31. E	51. C	71. C	91. C
12. B	32. C	52. C	72. C	92. B
13. C	33. D	53. B	73. B	93. B
14. C	34. D	54. C	74. C	94. C
15. C	35. C	55. D	75. C	95. D
16. C	36. D	56. C	76. A	96. C
17. C	37. C	57. D	77. C	97. C
18. B	38. D	58. C	78. C	98. D
19. C	39. D	59. C	79. D	99. D
20. C	40. C	60. C	80. C	100. D