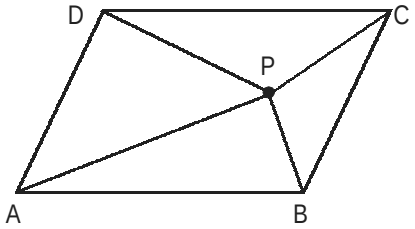
Section – III

61 Rajan was standing on an escalator going down when 15 steps below him Naveen started walking down at a speed three times that of a escalator. On reaching the landing, he immediately started walking upwards meeting Rajan at an exact point where he had started walking down. How many steps further down from this spot is the landing?

a. 20 steps b. 40 steps c. 36 steps d. None of these

62. ABCD is a parallelogram and P is any point within it. If the area of the parallelogram ABCD is 20 units, then what is the sum of the areas of the ΔPAB and ΔPCD?

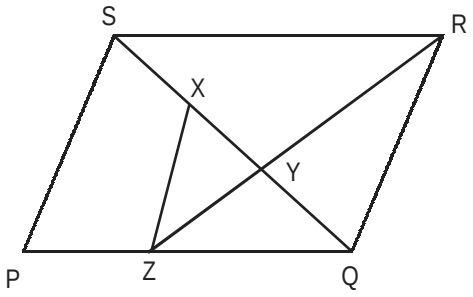


a. 5 units b. 10 units c. 12 units d. Cannot be determined

63. What is the maximum difference between two 4 digits numbers of the form 'abcd' such that 'abc' is divisible by 3 and 'bcd' is divisible by 4? The digits a, b, c, d are all distinct.

a. 8884 b. 8828 c. 8852 d. None of these

64. In the given figure, PQRS is a parallelogram. PS is parallel to ZX, Y is the point of intersection of RZ and SQ and $\frac{PZ}{ZQ}$ equals $\frac{2}{3}$. Then $\frac{XY}{SQ}$ equals



a. $\frac{1}{4}$ b. $\frac{9}{40}$ c. $\frac{1}{5}$ d. $\frac{9}{25}$

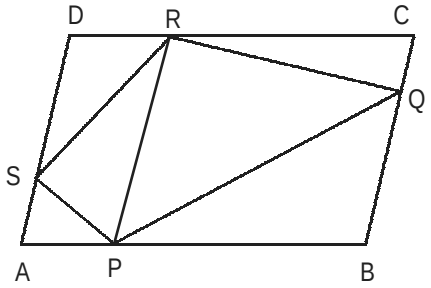
65. a, b, c, d, e, f are 6 consecutive 3 digit even numbers. If all possible products of such numbers are expressed as $2^k \times m$, where m is relatively prime to 2 and $k \in N$. Then the average of maximum and minimum value of k is

a. 13 b. 13.5 c. 14 d. None of these

66. There are 12 pipes connected to a tank. Some of them are fill pipes and the others are drain pipes. Each of the fill pipes can fill the tank in 8 hours and each of the drain pipes can drain completely in 6 hours. If all the pipes are kept open, an empty tank gets filled in 24 hours. How many of the 12 pipes are fill pipes?

a. 5 b. 6 c. 7 d. 8

67. ABCD is a parallelogram. P, Q, R, S are points on sides AB, BC, CD and DA respectively such that AP = DR. If the area of parallelogram ABCD is 16 units, the area of the quadrilateral PQRS is



a. 8 units b. 12 units c. 6 units d. Cannot be determined

68. Which is the smallest value of x for which x! is divisible by 3^7?

a. 15 b. 16 c. 18 d. None of these

69. From a 3 : 5 solution of milk and water, 20% is taken out and replaced by milk. How many times should this process be done to make the ratio of milk to water as 17 : 8 ?

a. Once b. Twice c. Thrice d. Four Times

70. There is a series of 2n + 1 terms that are in an Arithmetic Progression. The average of the first (2n – 1) terms is 12. The average of the first 2n terms is 15. The sum of all the terms of the series is

a. 30 n + 15 b. 36 n + 18 c. 24 n + 12 d. Data Insufficient

71. There is a 10 digit number whose first digit is equal to the number of 1's in the number, the second digit is equal to the number of 2's in the number, the third digit is equal to the number of 3's so on. The tenth digit of the number is equal to the number of Zeroes in the number. What is the sum of the digits of the number ?

a. 8 b. 9 c. 10 d. None of these.

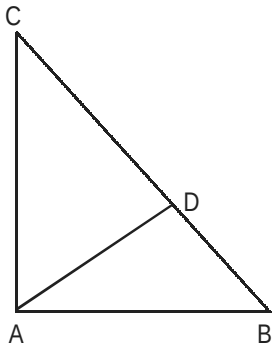
72. All the first 150 positive multiples of 3 are placed side by side .What is the sum of all the digits of this number so formed ?

a. 450 b. 1350 c. 1593 d. None of these

73. In how many ways can you divide 4 identical green balls and 4 identical red balls into 2 groups of 4 each?

a. 15 b. 35 c. 70 d. None of these

74. ΔABC is right angled at A. AB = 60 units, AC = 80 units, BC = 100 units. D is a point between B and C such that the ΔADB and ΔADC have equal perimeters. Determine the length AD.



a. $12\sqrt{5}$ units b. $36\sqrt{5}$ units c. $48\sqrt{5}$ units d. None of these

75. A fruit dealer fixes selling price of watermelon including 10% tax on the selling price and 30% profit. He sells it further at a surcharge of 15% to a juice centre. The owner of the juice centre mixes 25% water to the pure juice and offers a discount of 4% to his customer. If all the juice of the watermelon costs Rs. 161 to the customer and there is no tax on juice, what is the cost price of the watermelon for the fruit dealer?
a. Rs. 76.50 b. Rs. 81.50 c. Rs. 83.30 d. Rs. 87.50

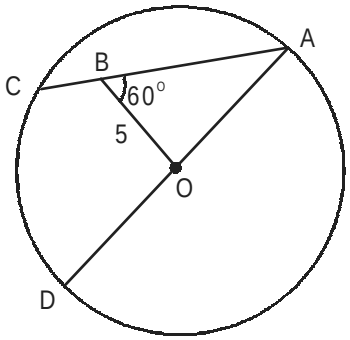
76. ΔABC has integral sides AB, BC measuring 2001 and 1002 units respectively. The number of such triangles is
a. 2001 b. 2002 c. 2003 d. 2004

77. How many numbers from 1 to 1000 are divisible by X but not by X^2, if X is any integer from 4 to 6?
a. 346 b. 337 c. 321 d. None of these

78. In a village called Shadinagar each man is married to 5 women and each woman married to 4 men, there are 22 houses and not more than 4 people stay in each house. 33 men are farmers. Find the total population of Shadinagar. (Assuming there is no unmarried person in the village).
a. 72 b. 78 c. 81 d. Cannot be determined

79. If $a = 2^x \times 3^y$ and $b = 2^l \times 3^m$ and all of x, y, l, m are positive integers. What is the probability that $\frac{a}{b}$ is an integer ?
a. $\frac{1}{2}$ b. $\frac{1}{6}$ c. $\frac{1}{4}$ d. $\frac{3}{4}$

80. In a circle with centre O, AD is a diameter, ABC is a chord, BO = 5 units and $\angle ABO = \angle OCD = 60°$. Then the length of BC is



a. 3 units b. $\left(3+\sqrt{2}\right)$ units c. $\left(5-\frac{\sqrt{3}}{2}\right)$ units d. 5 units

Directions for question 81: Answer the question based on the given information.

f (x) = |x| + |y|
g (x) = max (x + y, x – y)
h(x) = min (x + y, x – y)

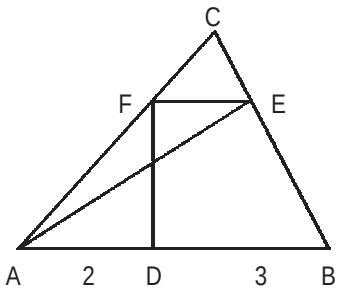
81. I. $g(x) \geq f(x)$

II. $g(x) + h(x) \geq f(x)$

III. $g(x) > f(x)$

Which of the following are not necessarily true?
a. I and III b. I and II c. II and III d. I, II and III

82. ΔABC in the figure has area 10 units. Points D, E and F, all distinct from A, B and C, are on sides AB, BC and CA respectively, and AD = 2 units, DB = 3 units. If ΔABE and quadrilateral DBEF have equal areas, then that area is



a. 6 units b. 7 units c. 5 units d. None of these

83. If $X^{a.b.c} = X^a \cdot X^b \cdot X^c$, where a, b, c are all positive integers, then $(a^2 + b^2 + c^2)$ is :
a. 8 b. 20 c. 14 d. 16

84. If n is any positive integer, then $\underbrace{111...1}_{2n \text{ times}} - \underbrace{22...2}_{n \text{ times}}$ is

a. $\underbrace{(44...4)^2}_{n \text{ times}}$ b. $\underbrace{(33...3)^2}_{n \text{ times}}$ c. $\underbrace{(33...3)^2}_{2n \text{ times}}$ d. $\underbrace{(44...4)^2}_{2n \text{ times}}$

85. A shopkeeper buys 10 items. He sells the first item after doubling its price. He sells the second item after doubling the price of the first item. He sells the third after doubling the price of the second item…and so on. The profit %, if he sells all the 10 items in a similar fashion, is
a. 1024% b. 1023% c. 20360% d. 2046%

86. A is thrice as fast as B. If A takes 60 days less than B to work, find the number of day it would take to complete the work if both work together, where, in working together, the rate of A increases by $\frac{1}{3}$ and that of B by $\frac{1}{2}$ of their initial rates.

a. $22\frac{1}{11}$ days b. $23\frac{51}{11}$ days c. $16\frac{4}{11}$ days d. None of these

87. An unbiased coin is tossed 5 times. If the first 3 tosses are all heads, what is the probability that the fourth toss is also heads ?

a. $\frac{1}{2}$ b. $\frac{3}{4}$ c. $\frac{4}{5}$ d. None of these

88. How many numbers in the first 100 natural numbers can be expressed in the form of P^X, where P is a prime number and X is a positive integer ?
a. 10 b. 14 c. 16 d. None of these

89. Exactly three of the interior angles of a convex polygon are obtuse. What is the maximum number of sides of such a polygon?
a. 7 b. 5 c. 6 d. None of these

90. Ram forgot the birthday of his friend Saurabh. Ram knows that he was born in a month which is a perfect cube. He also knows that the date is just less than a perfect square. He also recalls that the date has maximum number of prime factors. Lastly he recalled that Saurabh was not born in a month of January. What is Saurabh's date of birth?
a. 15th March b. 12th August c. 8th August d. None of these

91. If $8^x = 5^y = 40^6$, what is the value of $\frac{x+y}{xy}$?

a. $\frac{1}{6}$ b. 6 c. $\frac{1}{40}$ d. None of these

92. A person is traveling 3 successive equal distances such that the average speed in the first part is 20 km/hr and the average speed in the 3rd part is 12 km/hr. Find the average speed in the 2nd part of the journey if the average speed of the journey 16 km/hr.

a. 14 km/hr b. 16 km/hr c. $\frac{240}{13}$ km/hr d. None of these

93. Sum $1 + 3x + 6x^2 + 10x^3 + 15x^4$ ..... to infinity, I x I being less than 1

a. $\frac{1}{1-x}$ b. $\frac{1}{(1-x)^2}$ c. $\frac{1}{(1-x)^3}$ d. None of these

94. Sixty percent of students at a certain school wear neither a ring nor a necklace. Twenty percent wear a ring and 30 percent wear a necklace. If one of the students is chosen randomly, what is the probability that this student is wearing at least a ring or a necklace?

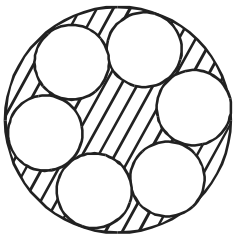
a. 0.3 b. 0.4 c. 0.7 d. Data insufficient

95. Which is the smallest 4 digit number $(abcd)_{x,}$ whatever be the value of the base x?

a. 1000 b. 1001 c. 1002 d. 1003

96. If $x + y + z = 3$, then what is the maximum value of $(x^2 + 2xy + 3)(y^2 + 2xz - 3)(z^2 + 2yz + 3)$?

a. 27 b. 64 c. 123 d. Cannot be determined

97. 

Find the area of the shaded portion if all small circles are equal with radius = 7 cm.

a. 412 cm^2 b. 569 cm^2 c. 192 cm^2 d. 462 cm^2

98. How many integer solutions exist if $|x + 6| + |x - 6| = 12$?

a. 7 b. 10 c. 12 d. 13

99. $(N + 12)^2$ is divisible by N and N is a natural number. How many values can N take ?

a. 6 b. 15 c. 4 d. 12

100. Find the solution for x if $\sqrt{(x+6)} < x$

a. $x > 3$ b. $x < -2$ c. $x > 3$ or $x < -2$ d. None of these