Q 1. A circle is drawn inside a rectangle ABCD and does not touch its sides. There are 24 parallel secants drawn in the circle, and three parallel secants are perpendicular to the first set of secants. All secants have their end points on the perimeter of the rectangle. The maximum number of regions that the rectangle is divided into is _____.

Q 2. A swimming pool is 120 feet long. John and Terry start from the opposite ends of the pool at speeds of 5 feet/s and 4 feet/s respectively and swim for 15 minutes. How many times do they cross each other?

1) 37

2) 35

3) 34

4) 33

Q 3. N is a natural number such that 300 < N < 600. P is the sum of N and the number formed by reversing its digits. The number formed by reversing the digits of N is also a three digit number. If P is equal to 'k' times the sum of the digits of N which is 9, find the minimum possible value of k.

1) 20

2) 47

3) 65

4) 56

Q 4. Seven students appeared for an exam in which the maximum marks were 100. The marks scored by the students in the exam were found to be seven distinct integer values. The arithmetic mean of their marks was 85 whereas the median of their marks was 90. What could be the maximum difference between the marks of any two students?
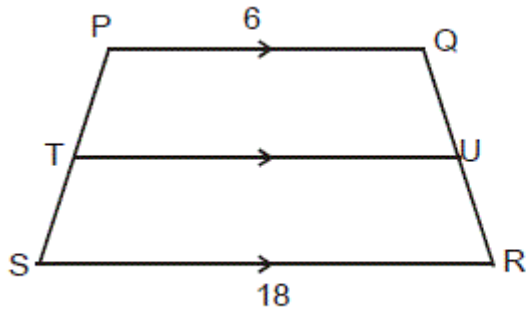

Q 5. There are 10 boxes – B1, B2, B3, ..., B10 – with a certain number of balls each. The number of balls in the nth box is 'n' more than that in (n − 1)th box, for n > 1. If the number of balls in B4 is 15, what is the total number of balls in 10 boxes put together?

Q 6. Let f(x) + f(2x) + f(1 + x) + f(2 − x) = x for all x. What is the value of 16 × f(0)?

1) −8

2) −4

3) 0

4) 4

Q 7.

PQRS is a trapezium with PQ || TU || SR. If the ratio of the area PQUT : TURS = 3 : 1. Find PT/TS.

1) $\dfrac{3-\sqrt{7}}{\sqrt{7}-1}$

2) $\dfrac{\sqrt{7}-1}{3-\sqrt{7}}$

3) 3

4) 1/3

Q 8. The volumes of two containers - A and B - are 36 liters and 24 liters, which contain milk and water solutions. If the entire quantity of these two solutions is mixed, the concentration of milk in the resulting solution is 40%. If 18 liters of each of the two solutions are mixed, the amount of Milk in the resulting solution is 15 liters. What is the concentration of milk of the 24 liters mixture?

1) 33.33%

2) 50%

3) 66.66%

4) 75%

Q 9. In a school there are 30 Quiz teams of 5 each and N cultural teams of 4 each. Every student in the school is a member of exactly 6 quiz teams and exactly 8 cultural teams. Find the value of N.

Q 10. How many points (a, b) where a and b are whole numbers, are on or inside the region bounded by x-axis; x = 5 and the graph y = x^2?

1) 54

2) 55

3) 60

4) 61

Q 11. Ashish had Rs. 100 which he completely used up to buy a, b, c quantities of toffees, chocolates and packets of chips each of which cost him Re.1, Rs. 15 and Rs. 25 respectively. If he bought at least one unit of each item, the number of triplets (a, b, c) that is possible is

1) 14

2) 8

3) 12

4) 4

Q 12. In a triangle ABC right-angled at B, the bisector of the external ∠CAF, when produced, intersects the base CB (extended) at E. If AB = 6 cm and AC = 10 cm, then find the length (in cm) of the line segment AE.

1) 10

2) 8√3

3) 10√2

4) 6√5

Q 13.

If xy + yz + zx = 0, then the value of $\left(\dfrac{1}{x^2 - yz} + \dfrac{1}{y^2 - zx} + \dfrac{1}{z^2 - xy} \right)$ is

1) 0

2) 1

3) 3

4) x + y + z

Q 14. A = $\log_{10}(1 + 2 + 3 + ... + n) + \log_{10}2$, where n is a natural number. Find the number of possible values of n for which 2 < A < 3.

Q 15. In a quadrilateral ABCD, AC and BD intersect at O, where AB = 32 cm, AO = 30 cm, OB = 10 cm, BC = 26 cm, OC = 24 cm, OD = 18 cm and CD = 30 cm. If it is given that one of the dimensions out of AB, BC and CD is incorrect while all the other dimensions are correct, then the incorrect dimension is of side ___.

1) AB

2) BC

3) CD

4) Cannot be determined

Q 16. In 2020 the ratio of tariff to number of existing users was 1 : 40 for vfone. In 2020, when vfone increased the tariff by 20%, the number of users decreased by 20%. In 2021, vfone again increased its tariff pack by 10% and number of users further decreased by 15%. Which of the following could be the current tariff among the choices, if tariff is always a natural number? (in Rs.)

1) 770

2) 660

3) 682

4) 894

Q 17. ABC is an isosceles triangle with AB = AC. DEF is an equilateral triangle with its vertices D, E, F on AB, BC, AC respectively. If ∠CFE = 40° and ∠ADF = 30°, then what is the angle ∠DEB equal to (in degrees)?

Q 18. If |x − 1| − |x| + |2x + 3| ≥ 2x + 4, where x ≥ −10, then the possible integer values of x is

1) 10

2) 11

3) 9

4) 8

Q 19. From the set of the first 9 natural numbers, three distinct prime numbers a, b and c are selected to form a quadratic equation of the form $ax^2 + bx + c = 0$, having real roots. How many such equations can be formed?

Q 20. Aman, Bhaskar takes a, b days to complete a job independently. If they take turns to work independently on the job, on alternate days the task is completed in 8 days. If a + b > 20 days, find the time taken by Bhaskar to finish the task if he is the slower among the two.

Q 21. A group comprising some women and men can complete a piece of work in 96 days. If a man in the group is replaced by a woman, the resulting group can complete the same work in 72 days. If two men in the original group are replaced by two women, then in how many days can the resulting group complete the work?

1) 48

2) 57.6

3) 60

4) 67.6

Q 22. The function f(x) is defined for all real values of x as f(x) = min (2x + 1, x + 2, −4x + 8). What is the maximum value of f(x)?

1) 3

2) 3.2

3) 3.4

4) 4