

Sample Question Paper

Mathematics

Class 10

Time : $2\frac{1}{2}$ Hours

Score : 80

Instructions

- Use the first 15 minutes to read the questions and think about the answers
 - There are 26 questions, split into four parts A, B, C, D
 - Answer all questions; but in questions of the type **A or B**, you need answer only one of those
 - You can answer the questions in any order, writing the correct question number
 - Answers must be explained, whenever necessary
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Section A

(1) Which of the numbers below is not a term of the arithmetic sequence 1, 7, 13, ...?

(A) 61 (B) 81 (C) 91 (D) 121 (1)

(2) Read the two statements below:

Statement A : If the 5th term of an arithmetic sequence is 8, then the sum of the 3rd and 7th terms is 16

Statement B : The sum of two numbers got by adding and subtracting the same number from a number, is twice this number

Now choose the correct answer from those given below:

- (i) A is true, B is false
- (ii) A is false, B is true
- (iii) Both are true and B is the reason for A
- (iv) Both are true and B is not the reason for A (1)

(3) (A) The 4th term of an arithmetic sequence is 80 and the 7th term is 60

- (i) What is the 10th term of this sequence?
- (ii) What is the first term?

OR

(B) In the arithmetic sequence 8, 15, 22, ...

- (i) Can the difference between any two terms be 56?
- (ii) Is 302 a term of this sequence? If so, what is its position? (3)
- (4) The sum of the first 5 terms of an arithmetic sequence is 40 and the sum of the first 13 terms is 260
- (i) What is the 3rd term of the sequence?
- (ii) What is the 7th term?
- (iii) Write the first three terms of this sequence
- (5) The sum of the first 8 terms of an arithmetic sequence is 240
- (i) Calculate the sum of the 4th and 5th terms of this sequence
- (ii) The 3rd term is 15. What is the 6th term?
- (iii) Write three arithmetic sequences with the sum of the first 8 terms 240 (5)

Section B

- (6) The algebraic form of an arithmetic sequence is $x_n = 7 - 5n$. To get its 101st term from the 100th term, what we must do is
- (A) add 5 (B) subtract 5 (C) add 7 (D) subtract 7 (1)
- (7) The position at which the graph of the polynomial $x^2 - 6x + 9$ meets the horizontal line?
- (A) 3 (B) -3 (C) 6 (D) -6 (1)
- (8) Prove that the square of any term of the arithmetic sequence 3, 9, 15, ... is the product of an odd number by 9 (3)
- (9) The sum of two numbers is 6 and their product is 7
- (i) One of these numbers is larger than 3 and the other is smaller than 3. Why?
- (ii) Calculate the numbers (4)
- (10) Two arithmetic sequences are given below:
- 5, 11, 17, ...
8, 14, 20, ...
- (i) What is the difference of the 4th terms of the two sequences?
- (ii) How much more is the sum of the first 25 terms of the second sequence, than the sum of the first 25 terms of the first sequence? (4)
- (11) The sequence of the sums of the consecutive terms of an arithmetic sequence starting from the first, is 5, 16, 33, ...
- (i) Calculate the first and second terms of the sequence

(ii) Write the algebraic form of the arithmetic sequence (4)

(12) One side of a rectangle is 14 centimetres longer than the other; and its diagonal is 26 centimetres

- (A) (i) Write these facts as a second degree equation
(ii) Calculate the lengths of the sides of the rectangle

OR

(B) One side of a right triangle is 7 centimetres longer than the side perpendicular to it; and its area is 60 square centimetres. Calculate the lengths of all three sides of the triangle (4)

- (13) (A) (i) Is the sequence of natural numbers which leave an odd remainder on division by 6, an arithmetic sequence? What is the reason?
(ii) Write the algebraic form of the sum of the first n terms of this sequence

OR

(B) The first term of an arithmetic sequence is 4 and the common difference is 3

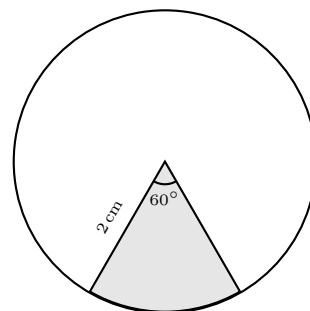
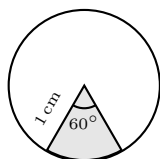
- (i) Calculate the sum of the first 10 terms of this sequence
(ii) Calculate the sum of the ten consecutive terms of this sequence from the 2nd to the 11th
(iii) Can the sum of any 10 consecutive terms of the sequence be 500? Why? (5)
- (14) (i) Write the algebraic form of the sum of the first n terms of the sequence 6, 10, 14, ...
(ii) How many consecutive terms, starting from the first, of this sequence must be added to get 880? (5)

Section C

(15) All three-digit numbers that can be formed using the digits 3, 8, 9 without repetition, are written on slips of paper and put in a box. If a slip is drawn from the box, what is the probability that the number is less than 800?

- (A) $\frac{1}{3}$ (B) $\frac{2}{3}$ (C) $\frac{1}{6}$ (D) $\frac{5}{6}$ (1)

(16) A point is marked within each of the circles shown in the picture:



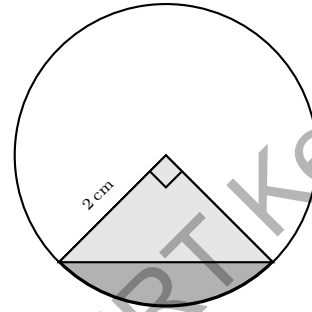
If the probability that the point is within the shaded part of the first circle is taken as p and the probability that the point is within the shaded part of the second circle is taken as q , then what is the relation between p and q ?

- (A) $p = 1 - q$ (B) $p = \frac{1}{2} - q$ (C) $p = \frac{1}{2}q$ (D) $p = q$ (1)

(17) In the picture, the ends of a chord of the circle are joined to the centre of the circle:

If a point is marked inside this circle, what is the probability that

- (i) it is inside the circle?
- (ii) it is inside the shaded segment of the circle?



(3)

(18) If a three-digit number is chosen and divided by 4, what is the probability that the remainder is 3? (4)

- (19) (A) Two dice marked with numbers 1 to 6 are rolled together. Calculate the probability that the numbers got
- (i) are both odd
 - (ii) have an odd number as sum
 - (iii) have an odd number as product

OR

(B) There are 20 boys and 15 girls in Class 10 A and 15 boys and 20 girls in Class 10 B. One student is to be selected from each class for participating in the Math Fair. Calculate the probability that

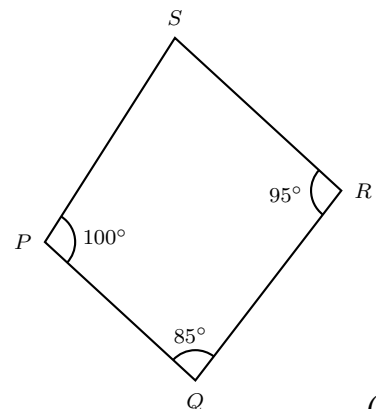
- (i) both are girls
- (ii) one is a girl and the other is a boy
- (iii) at least one is a boy

(5)

Section D

(20) If a circle is drawn to pass through the points P , Q , R in the picture, the point S would be

- (i) outside the circle
- (ii) inside the circle
- (iii) on the circle
- (iv) can't be decided from the given facts



(1)

(21) Read the statements below:

Statement A : In any circle, the angle subtended by an arc at a point on the opposite arc is half the central angle of the arc

Statement B : In any triangle, the outer angle at a vertex is the sum of the inner angles at the other two vertices

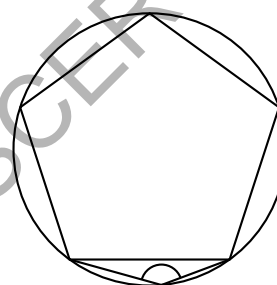
Now choose the correct answer from those given below:

- (i) A is true, B is false
- (ii) A is false, B is true
- (iii) Both are true and B is the reason for A
- (iv) Both are true and B is not the reason for A

(1)

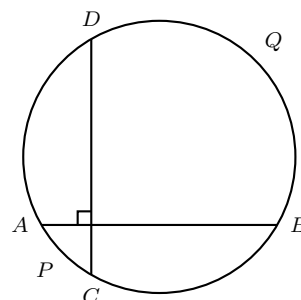
(22) An arc of a circle of radius 10 centimetres makes an angle of 18° at a point on the opposite arc. What is the length of the arc? (3)

(23) (A) In the picture, a regular pentagon is drawn with vertices on a circle. Calculate angle marked in the picture



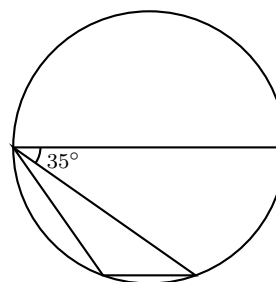
OR

(B) In the picture, AB and CD are perpendicular chords of the circle. Prove that the arcs APC and BQD joined together forms a semicircle



(3)

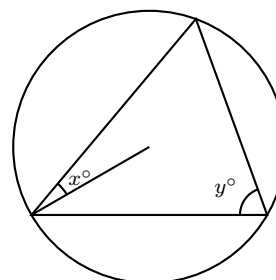
(24) (A) The picture shows a diameter of a circle and a chord parallel to it



Calculate all the angles of the triangle in the picture

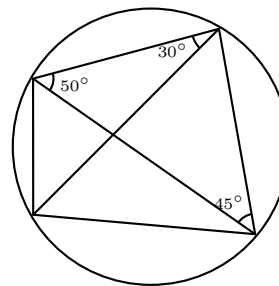
OR

(B) The picture shows a triangle with all three vertices on a circle and one of the vertices joined to the centre of the circle. Prove that $x + y = 90$



(4)

- (25) The picture shows a quadrilateral with all four vertices on a circle, and its diagonals. Calculate all the angles of the quadrilateral and an angle between the diagonals



- (26) Draw a circle of radius 3 centimetres. Draw a triangle with all three vertices on the circle and two of its angles $22\frac{1}{2}^\circ$ and $32\frac{1}{2}^\circ$

(5)

(5)