SSLC - 2022

MATHEMATICS

Practice Question for C Grade

1. ARITHEMETIC SEQUENCES

1. Write an arithmetic sequence with common difference 3.
   (a) 3, 6, 9, _______
   (b) 4, 7, 10, ______
   (c) ______, ______, ______, ______,
   (d) ______, ______, ______, ______,

2. Write first term and common difference of the arithmetic sequence.
   (a) 10, 12, 14, 16, ______

   First term $\left.\begin{matrix} f \\ a \\ t_1 \end{matrix}\right\} = 10$

   Common difference d = 12 – 10 = 2

   eg: 1) 8, 12, 16, ...
   2) 15, 18, 21, ...
   3) 21, 26, 31, ...

3. Complete the sequence.
   (1) 24, 42, ______, ______
   Ans: d = 42 – 24 = 18
   24, 42, <u>60,</u> <u>78</u>
   (2) 18, 26, ______, ______
   (3) 27, 40, ______, ______
   (4) 26, 40, ______, ______

4. Complete the sequence:
   (a) 10, _____, 20, _____
   1. 20, _____, 26, _____
   2. 24, _____, 42, _____
   3. 15, _____, 23, _____

$\underbrace{10, \_\_\_\_\_, 20}_{\to + \leftarrow}$ 10 + 20 = 30

10, <u>15,</u> 20 $\frac{30}{2} = 15$

5. Write the algebraic form of the sequence. (n^{th} term)

eg: (a) 15, 18, 21, ________

First term f = 15

Common difference d = 18 − 15 = 3

Algebraic form (n^{th} term) = dn + (f − d)

= 3n + (15 − 3)

= 3n + 12

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Write algebraic form

1) 5, 7, 9, ________
2) 10, 13, 16, ________
3) 5, 9, 13, ________

6. Find 10^{th} term of the arithmetic sequence.

eg : 10, 12, 14, ________

f = 10, d = 12 − 10 = 2

nth term (algebraic form) = 2n + 8

25^{th} term = t_{25} = 2n + 8 = > 2 x 25 + 8 | n = 25

= > 50 + 8 = 58

t_{25} = 58

(a) Find 12^{th} term of the seq. 20, 22, 24, ...

(b) Find 25^{th} term of the seq. 18, 22, 26, ...

(c) Find 100^{th} term of the seq. 2, 4, 6, 8 ....

7. a) Write the algebraic expression of the sequence

9, 15, 21, ________

(b) Find the position of 195 in this sequence?

Ans : (a) 9, 15, 21, ________

f = 9 d = 15 − 9 = 6

t_n = dn + (f − d)

= 6n + (9 − 6) = 6n + 3

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(b) 6n + 3 = 195

6n = 195 − 3 = 192

$n = \frac{192}{6} = 32$ ∴ 32^{th} term of the seq. is 195

8. (a) Write the algebraic expression of the sequence

10, 12, 14, ___, ____, ...

(b) Find the position of 58 in this sequence?

9. Is 2012 a term of the sequence 5, 9, 13, ...

Ans : First term f = 5; Common difference d = 9 – 5 = 4

$\frac{5}{4} \rightarrow$ 1. Reminder '1'

$\frac{9}{4} \rightarrow$ 2. Reminder '1'

$\frac{13}{4} \rightarrow$ 3. Reminder '1'

$\frac{2012}{4} \rightarrow$ 503 Reminder '0'

$\therefore$ 2012 is not a term of this sequence

10. Consider the arithmetic sequence 12, 23, 34, ...

(a) What is the 10^{th} term of this sequence?

(b) Is 165 a term of this sequence? Why?

11. Complete the sequence.

(a) _____, 7, _____, _____, 19

Ans: Common diffreence = $\frac{\text{Term difference}}{\text{Position difference}}$

2^{nd} Term = 7

5^{th} Term = 19

$$\therefore\ d = \frac{5^{th}\text{ Term - }2^{nd}\text{ Term}}{5-2} = \frac{19-7}{5-2} = \frac{12}{3} = 4$$

d = 4

$\therefore$ the sequence

2^{nd} Term = 7

d = 4

$\therefore$ 1^{st} term = 7 – 4 = 3

3^{rd} term = 7 + 4 = 11

4^{th} term = 11 + 4 = 15

i.e, 3, 7, 11, 15, 19

12. Complete the sequence.

1. ______, 8, ______, ______, 23
2. ______, 5, ______, ______, 15
3. ______, 4, ______, ______, 22

13. Find the sum of first 5 odd numbers.

$1 + 3 + 5 + 7 + 9$

Sum of first 'n' odd numbers.

$1 + 2 + 3 + 4 + \text{........}n = n^2$

$1 + 3 = 2^2 = 4$

$1 + 3 + 5 = 3^2 = 9$

$1 + 3 + 5 + 7 = 4^2 = 16$

$1 + 3 + 5 + 7 + 9 = 5^2 = 25$

$1 + 3 + 5 + \text{........} + 15 =$ _____

$1 + 3 + 5 + \text{........} + 21 =$ _____

14. Find the sum of terms of the series.

10, 12, 14, ______ 102.

$t_1 = f = 10$ $d = 2$ $t_n = 102$

Number of terms 'n' $= \dfrac{tn - t1}{d} + 1$

$$n = \frac{102 - 10}{d} + 1 = \frac{92}{2} + 1 = 46 + 1 = 47$$

$$\text{Sum} = \frac{47}{2}(\text{First term} + \text{Last term})$$

$$= \frac{47}{2}(10 + 102) = \frac{47}{2}(112) = \frac{47 \text{ x } 112}{2} = 282$$

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15. Find the sum of terms:

1. 10, 15, 20, 25, _______ 125
2. 25, 50, 75, _______ 675
3. 2, 4, 6, 8, 10, _______ 1002
4. 10, 20, 30, ________, 110

1. Arithemetic Sequences

1. Consider the arithmetic sequence 5, 9, 13 ......
   (a) Write next two terms.
   (b) Is 2012 a term of this sequence ? Why ?

2. Consider the arithmetic sequence 12, 23, 34, ...
   (a) Write algebraic form of this sequence.
   (b) Find 10^{th} term ?

3. Write an arithmetic sequence with common difference 3. Find its 11^{th} term.

4. Find the missing term of the given arithmetic sequences.
   (a) 10, _____, 20, _______
   (b) 12, _____, 20, ______
   (c) 15, _____, _____, 30
   (d) 6, _____, _____, 18
   (e) _____, 6, _______, 16
   (f) _____, 24, ______, 42

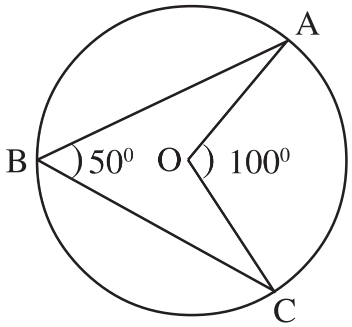
5. The algebraic form of an arithmetic sequence is $6n + 5$.
   (a) Write the sequence.
   (b) Find 15^{th} term.

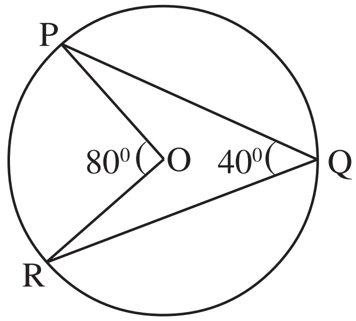
6. The algebraic form of an arithmetic sequences is $3n + 5$.
   (a) Write the sequence
   (b) Find 20^{th} term

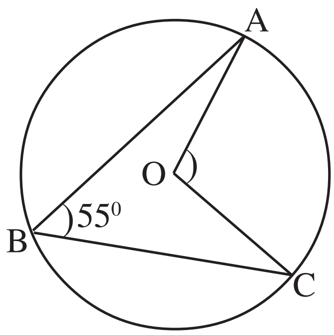
7. 8^{th} term of an Arithmetic sequence is 53 and 15^{th} term is 102.
   (a) Find the common difference.
   (b) Find 25^{th} term of this sequence.

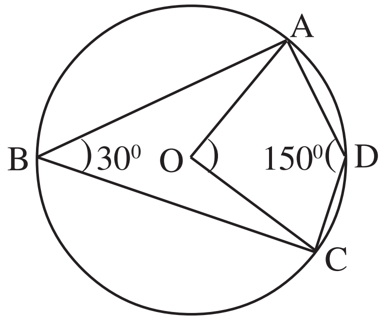
<u>**CIRCLES & TANGENTS**</u>

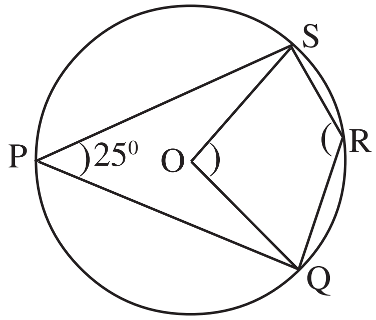
- Angle in a semicircle is right angled. (90^0)
- Half central angle of an arc is equal to the angle made by that arc on the alternate arc.
- The opposite angles of a cyclic quadrilateral are supplementary. (Sum 180^0)

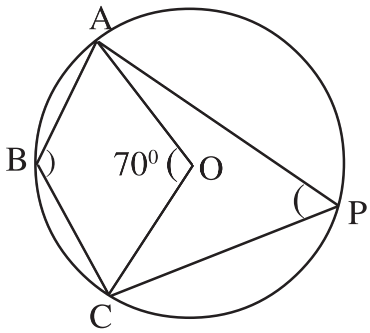




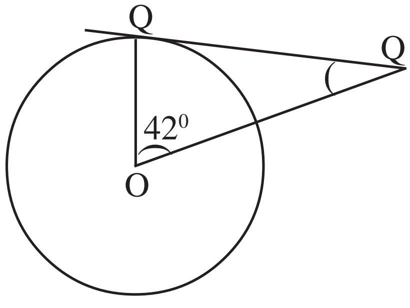






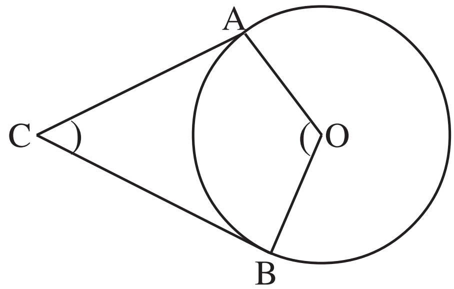


- Tangents and radius are $\perp$r.
- Any two points on the circle and the point of intersection of the tangents through those points constitute a cyclic quadrilateral.



PQ is a tangent

Find $\angle$P and $\angle$Q.



$\angle$C = 60^0

AC, BC are tangents.

Find $\angle$A, & $\angle$B.

Find $\angle$AOB.

CIRCLES - CONSTRUCTIONS

1. Draw a rectangle of sides 5 cm and 3 cm. Construct a square of the same area.
2. Draw a rectangle with sides 6 cm and 5 cm. Construct a square of the same area.
3. Draw a rectangle of sides 6 cm and 4 cm. Construct a square of the same area.

TANGENTS - CONSTRUCTIONS

1. Draw a circle of radius 4 cm, mark a point P on the circle. Draw a tangent through P.
2. Draw a circle of radius 4.5 cm. Mark a point P on the circle. Draw a tangent through the point P.
3. Draw a circle of radius 3 cm. Mark a point P 8 cm away from the its centre. Draw tangents from P to the circle. Measure the length of tangents.
4. Draw a circle of radiuis 4.5 cm. Mark a point P 8.5 an away from the centre. Draw tangents from P to the circle. Measure the length of tangents.

CIRCLES - CONSTRUCTIONS

1. Draw a circle with radius 5 cm. Draw a triangle with its vertices on the circle and having angles 35^0, 72^0, 73^0.
2. Construct a triangle with two angles 50^0 and 65^0 and circumradius 3 cm. Write the length of the sides of the triangle.
3. Construct a square of area $12cm^2$.
4. Draw a rectangle of sides 5 cm and 3 cm. Construct a square of the same area.
5. The sides of a triangle are 4 cm, 7 cm and 8 cm. Draw it and construct a square of the same area.
6. Draw an isosceles triangle of hypotenuse 7 cm.
7. Draw a rectangle of length 5 cm and breadth 4 cm. Construct a new rectangle having the same area and one of its sides as 6 cm.

TANGENTS - CONSTRUCTIONS

1. The radius of a circle touching all sides of an equilateral triangle is 3 cm. Draw this triangle.
2 Radius of an incircle to a triangle is 3 cm. Two angles of this triangle are 55^0 and 63^0. Draw this triangle.
3. Draw a triangle of sides 6 cm and 8 cm, angle between them is 70^0. And draw its incircle and measure its in radius.
4. Draw an equilateral triangle with sides 4 cm. Construct its incircle and measure the radius.
5. Draw a circle of radius 3 cm. Mark a point P, 8 cm away from its centre. Draw tangents from P to the circle. Measure the length of tangents.
6. Draw a triangle of sides 6 cm, 7 cm, and 8 cm. Draw a circle which touches all sides of the triangle and measure its radius.

COORDINATES, GEOMETRY AND ALGEBRA

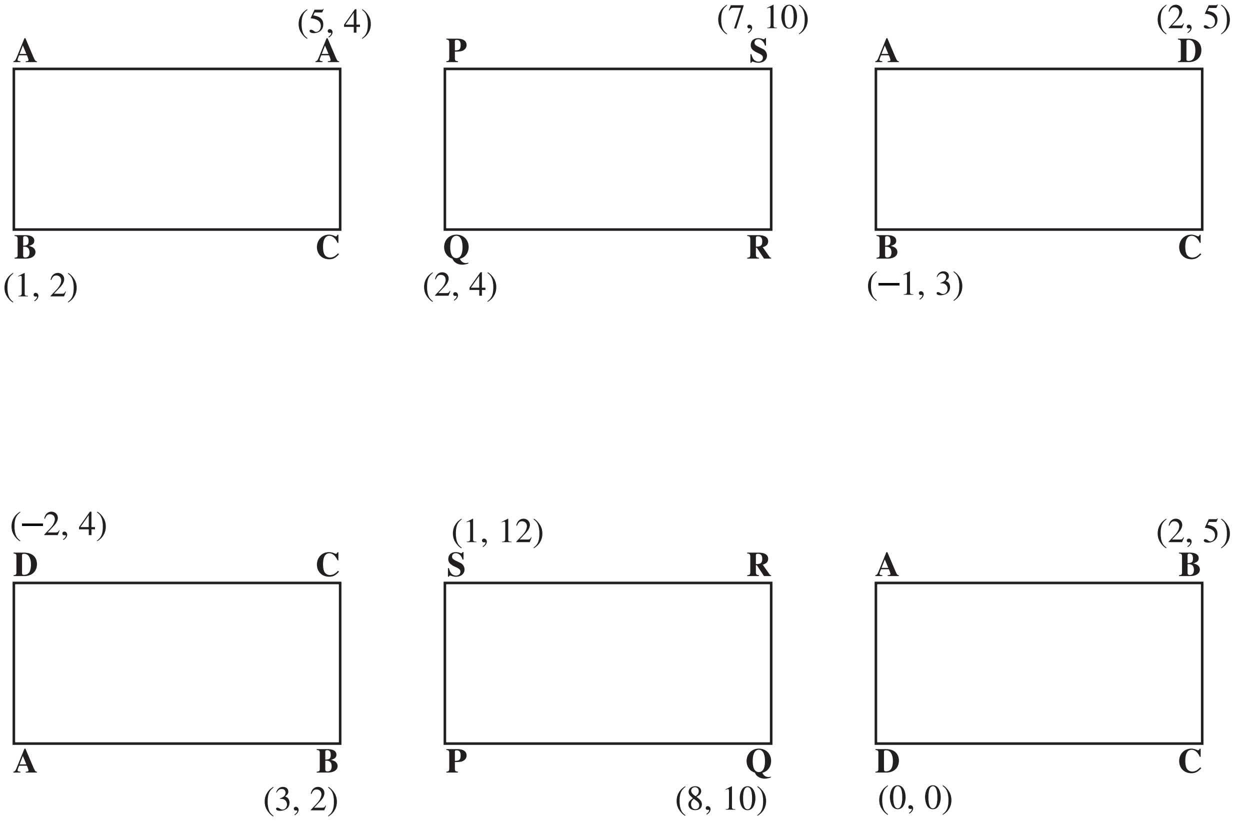
1. Draw X and Y axis. Mark the points given below.

   (a) (1, 2), (3, 4), (2, 1), (1, 1)

   (b) (0, 2), (3, 1), (−1, 2), (3, 0)

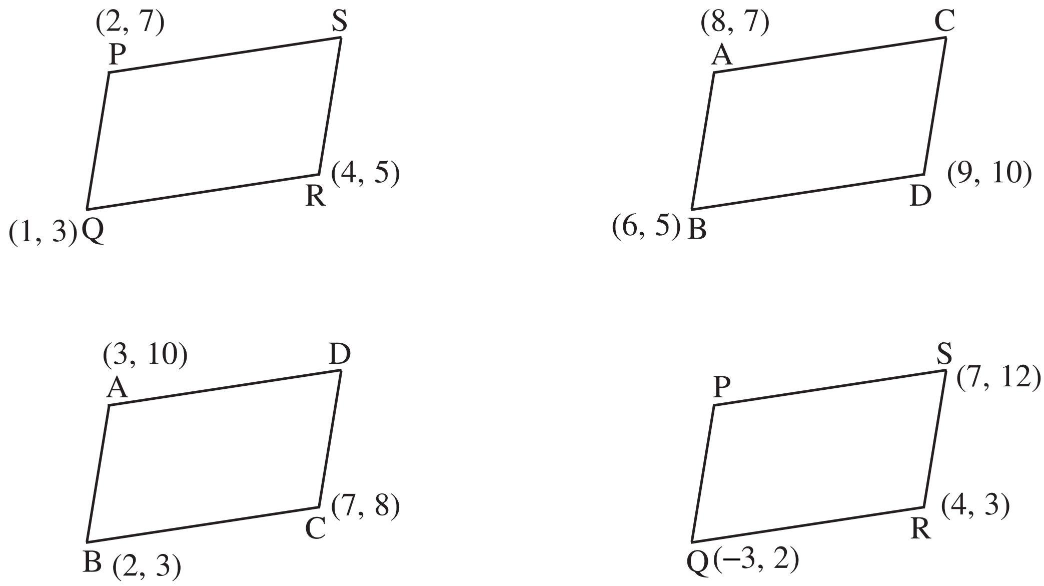
   (c) (1, 3), (0, 4), (4, 0), (−2, 3)

2. Two opposite vertices are given. Find co-ordinates of other two vertices.



3. Co-ordinates of two opposite vertices of a rectangle are given as (1, 2) and (3, 4). Find co-ordinates of other two vertices.

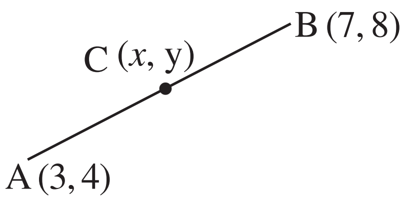
1. Find coordinates of the fourth vertex of the parallalogram.



2. A (2, 3), B (7, 4), D (3, 8) are the co-ordinates of vertices of a parallalogram ABCD. Find co-ordinates of vertex C.

Mid Point

1. Find the mid point of the line joining the points A (3, 4), B (7, 8)



Midpoint $= \left(\dfrac{x_1 + x_2}{2} \ , \ \dfrac{x_1 + x_2}{2} \right) \Rightarrow \left(\dfrac{3 + 7}{2} \ , \ \dfrac{4 + 8}{2} \right) \Rightarrow \left(\dfrac{10}{2} \ , \ \dfrac{12}{2} \right)$

$= (5, \ 6)$

2. Find coordinates of the midpoints.

(a) A (5, 7), B (8, 10)

(b) P (1, 2), Q (9, 12)

(c) A (2, 4), B (10, 12)

(d) A (0, 2), B (8, 10)

Slope

1. Find slope of the line joining the points A (1, 2), B (4, 7).

A (1, 2) B (4, 7)

$$\text{Slope} = \frac{y_2 - y_1}{x_2 - x_1} \longrightarrow \left(\frac{y \text{ difference}}{x \text{ difference}} \right)$$

$$\text{Slope} = \frac{7 - 2}{4 - 1} = \frac{5}{3}$$

2. Find slope
   (a) A (2, 3), B (2, 8)
   (b) P (1, 4), Q (5, 6)
   (c) A (0, 2), B (7, 9)

Distance formula

1. Find distance between the points A (1, 2), B (3, 7).

$$\text{distance} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

A (1, 2), B (3, 7)

$$\begin{aligned}\text{distance} &= \sqrt{(3-1)^2 + (7-2)^2} \\ &= \sqrt{2^2 + 5^2} \\ &= \sqrt{4 + 25} = \sqrt{29}\end{aligned}$$

2. Find distance (length)
   (a) A (1, 4), B (3, 8)
   (b) P (2, 3), Q (10, 12)
   (c) O (0, 0), P (7, 8)
   (d) P (−2, −1), (1, 4)

3. The three vertices of a parallalogram PQRS are P(−3, 2), Q(2, 7), S(1, 9) . Find the length of the diagonal PR.

STATISTICS

1. Find mean and median.

   (a) 135, 120, 148, 153, 124, 122, 150, 147

   (b) 38, 43, 24, 42, 33, 46, 29

   (c) 34, 44, 32, 41, 38, 46, 45, 40

   (d) 37.5, 47.5, 30, 35, 50, 32.5, 42.5, 45

2. Find median

(a)

Wage	No.
5000	3
6000	7
7000	8
8000	5
9000	5
10000	4
11000	3

(b)

Age	No.
12	5
13	8
14	7
15	10
16	6
17	4

(c)

Wage	No.
225	4
250	7
270	9
300	5
350	3
400	2

(d)

Wage	No.
0 - 50	3
50 - 100	5
100 - 150	14
150 - 200	12
200 - 250	6
250 - 300	3

(e)

Mark	No.
0 - 10	5
10 - 20	8
20 - 30	10
30 - 40	7
40 - 50	5

(f)

Wage	No.
200 - 300	3
300 - 400	7
400 - 500	10
500 - 600	8
600 - 700	4
700 - 800	3

POLYNOMIALS

1. Find the reminder when $5x^2 + 7x + 1$ is divided by $(x-2)$.

   $P(x) = 5x^2 + 7x + 1$

   $(x-2)$

   $P(2) = 5(2)^2 + 7(2) + 1 = 5 \times 4 + 7 \times 2 + 1 = 20 + 14 + 1$

   $P(2) = 35$

   ==

2. Find reminder when $P(x) = 3x^2 + 4x + 2$ is divided by $(x+1)$.

   $P(x) = 3x^2 + 4x + 2$

   $(x+1)$

   $P(-1) = 3(-1)^2 + 4(-1) + 2 = 3 \times 1 + 4(-1) + 2$

   $P(-1) = 3 - 4 + 2 = 1$

3. Check whether $(x-1)$ is a factor of $x^3 - 3x^2 + 7x - 1$.

   $P(x) = x^3 - 3x^2 + 7x - 1$

   $(x-1)$

   $P(1) = (1)^3 - 3(1)^2 + 7(1) - 1 = 1 - 3 + 7 - 1 = 4$

   $P(1) = 4$

   $(x-1)$ not a factor

4. $(x-2)$ is a factor of $Kx^2 - 4x + 1$. Find the value of K ?

   $(x-2)$ $\quad P(x) = Kx2 - 4x + 1$ $\quad (x-2)$ is factor $\quad \therefore P(2) = 0$

   $P(2) = K(2)^2 - 4(2) + 1 = 0$

   $P(2) = 4K - 8 + 1 = 0$

   $= 4K - 7 = 0$

   $4K = 7, \quad K = \frac{7}{4}$