

MATHEMATICS

Arithmetic Progression

Sum of First n Terms of an AP

EXERCISE 5.3

15. A contract on construction job specifies a penalty for delay of completion beyond a certain date as follows: Rs 200 for the first day, Rs 250 for the second day, Rs 300 for the third day, etc., the penalty for each succeeding day being Rs 50 more than for the preceding day. How much money the contractor has to pay as penalty, if he has delayed the work by 30 days?

Soln:- (.....Contd)

$$S_n = \frac{n}{2} [2a + (n-1)d]$$

$$S_{40} =$$

$$S_n = \frac{30}{2} [2a + (30-1)d]$$

$$= 15[2a + 29d]$$

$$= (15)(400 + 1450)$$

$$= (15)(1850)$$

$$= 27750$$

16. A sum of Rs 700 is to be used to give seven cash prizes to students of a school for their overall academic performance. If each prize is Rs 20 less than its preceding prize, find the value of each of the prizes.

Soln:- Since each Prize is Rs 20 less than its preceding Prize, therefor, the values of the seven successive cash prizes will form an AP

Let the first prize be Rs a

Then the winner prizes in succession will be Rs $(a-20)$, Rs $(a-40)$, Rs $(a-60)$ etc
Here $a = ?$

$$d = (a-20) - a = -20$$

$$n = 7$$

$$S_n = 700$$

$$S_n = \frac{n}{2} [2a + (n-1)d]$$

$$700 = \frac{7}{2} [2a + (7-1)(-20)]$$

$$700 = \frac{7}{2} [2a - 120]$$

$$700 = 7(a - 60)$$

$$a - 60 = \frac{700}{7}$$

$$a - 60 = 100$$

$$a = 100 + 60$$

$$a = 160$$

Value of first prize = Rs 160

Value of Second Prize

$$= \text{Rs } 160 - \text{Rs } 20$$

$$= \text{Rs } 140$$

Value of third Prize

$$= \text{Rs } 140 - \text{Rs } 20$$

$$= \text{Rs } 120$$

Value of fourth Prize

$$= \text{Rs } 120 - \text{Rs } 20$$

$$= \text{Rs } 100$$

Value of fifth Prize

$$= \text{Rs } 100 - \text{Rs } 20$$

$$= \text{Rs } 80$$

Value of Sixth Prize

$$= \text{Rs } 80 - \text{Rs } 20$$

$$= \text{Rs } 60$$

Value of Seventh Prize

$$= \text{Rs } 60 - \text{Rs } 20$$

$$= \text{Rs } 400$$

Circles

Exercise: 10.1

1. How many tangents can a circle have?

Ans: There can be **infinite** tangents to a circle. A circle is made up of infinite points which are at an equal distance from a point. Since there are infinite points on the circumference of a circle, infinite tangents can be drawn from them.

2. Fill in the blanks.

(i) A tangent to a circle intersects it in point(s).

(ii) A line intersecting a circle in two points is called a

(iii) A circle can have parallel tangents at the most.

(iv) The common point of a tangent to a circle and the circle is called

Ans:

(i) A tangent to a circle intersects it in **one** point(s).

(ii) A line intersecting a circle in two points is called a **secant**.

(iii) A circle can have **two** parallel tangents at the most.

(iv) The common point of a tangent to a circle and the circle is called the **point of contact**.

3. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that OQ = 12 cm. Length PQ is:

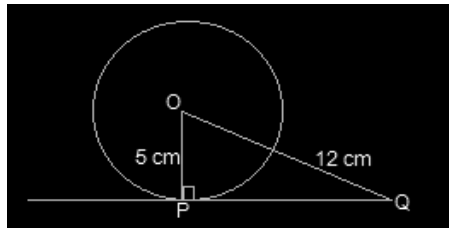
$$(A) 12 \text{ cm}$$

$$(B) 13 \text{ cm}$$

$$(C) 8.5 \text{ cm}$$

$$(D) \sqrt{119} \text{ cm}$$

Ans:



In the above figure, the line that is drawn from the centre of the given circle to the tangent PQ is perpendicular to PQ. And so, $OP \perp PQ$

Using Pythagoras' theorem in triangle ΔOPQ ,

we get,

(Contd...)