## Exercise 10(D) Page No: 146

**1. Find three numbers in A.P. whose sum is 24 and whose product is 440.**
**Solution:**

Let's assume the terms in the A.P to be (a - d), a, (a + d) with common difference as d.
Given conditions,
$S_n = 24$
$(a - d) + a + (a + d) = 3a = 24$
$a = 24/3 = 8$
And,
Product of terms = 440
$(a - d) \times a \times (a + d) = 440$
$a(a^2 – d^2) = 440$
$8(64 – d^2) = 440$
$(64 – d^2) = 55$
$d^2 = 9$
$d = \pm 3$
Hence,
When a = 8 and d = 3, we have
A.P. = 5, 8, 11
And, when a = 8 and d = -3 we have
A.P. = 11, 8, 5

**2. The sum of three consecutive terms of an A.P. is 21 and the sum of their squares is 165. Find these terms.**
**Solution:**

Let the three consecutive terms of an A.P. be (a - d), a, (a + d)
Given conditions,
Sum of the three consecutive terms = 21
$(a - d) + a + (a + d) = 21$
$3a = 21$
$a = 7$
And,
Sum of squares = $(a - d)^2 + a^2 + (a + d)^2 = 165$
$a^2 – 2ad + d^2 + a^2 + a^2 + 2ad + d^2 = 165$
$3a^2 + 2d^2 = 165$
$3(49) + 2d^2 = 165$
$2d^2 = 165 – 147 = 18$
$d^2 = 9$
$d = \pm 3$
Hence,
When a = 7 and d = 3, we have
A.P. = 4, 7, 10
And, when a = 7 and d = -3 we have

A.P. = 10, 7, 4

**3. The angles of a quadrilateral are in A.P. with common difference 20°. Find its angles.**
**Solution:**

Given, the angles of a quadrilateral are in A.P. with common difference 20°.
So, let the angles be taken as x, x + 20°, x + 40° and x + 60°.
We know that,
Sum of all the interior angles of a quadrilateral is 360°
$x + x + 20^o + x + 40^o + x + 60^o = 360^o$
$4x + 120^o = 360^o$
$4x = 360^o – 120^o = 240^o$
$x = 240^o/ 4 = 60^o$
Hence, the angles are
$60^o, (60^o + 20^o), (60^o + 40^o)$ and $(60^o + 60^o)$
i.e. 60°, 80°, 100° and 120°

**4. Divide 96 into four parts which are in A.P and the ratio between product of their means to product of their extremes is 15: 7.**
**Solution:**

Let 96 be divided into 4 parts as (a – 3d), (a - d), (a + d) and (a + 3d) which are in A.P with common difference of 2d.
Given,
$(a – 3d) + (a - d) + (a + d) + (a + 3d) = 96$
$4a = 96$
So, $a = 24$
And, given that,
$(a - d)(a + d)/ (a – 3d) (a + 3d) = 15/7$
$[a^2 - d^2]/ [a^2 – 9d^2] = 15/7$
Substituting the value of a, we get,
$(576 - d^2) / (576 - 9d^2) = 15 / 7$
On cross multiplication, we get,
$4032 - 7d^2 = 8640 - 135d^2$
$128d^2 = 4608$
$d^2 = 36$
$d = +6$ or $-6$

Hence,
When a = 24 and d = 6
The parts are 6, 18, 30 and 42
And, when a = 24 and d = -6
The parts are 42, 30, 18 and 6

**5. Find five numbers in A.P. whose sum is 12.5 and the ratio of the first to the last terms is 2: 3.**
**Solution:**

Let the five numbers in A.P be taken as (a – 2d), (a - d), a, (a + d) and (a + 2d).
Given conditions,
$(a – 2d) + (a - d) + a + (a + d) + (a + 2d) = 12.5$
$5a = 12.5$
$a = 12.5/5 = 2.5$
And,
$(a – 2d)/ (a + 2d) = 2/3$
$3(a – 2d) = 2(a + 2d)$
$3a – 6d = 2a + 4d$
$a = 10d$
$2.5 = 10d$
$d = 0.25$
Therefore, the five numbers in A.P are (2.5 – 2(0.25)), (2.5 – 0.25), 2.5, (2.5 + 0.25) and (2.5 + 2(0.25)) i.e. 2, 2.25, 2.5, 2.75 and 3.