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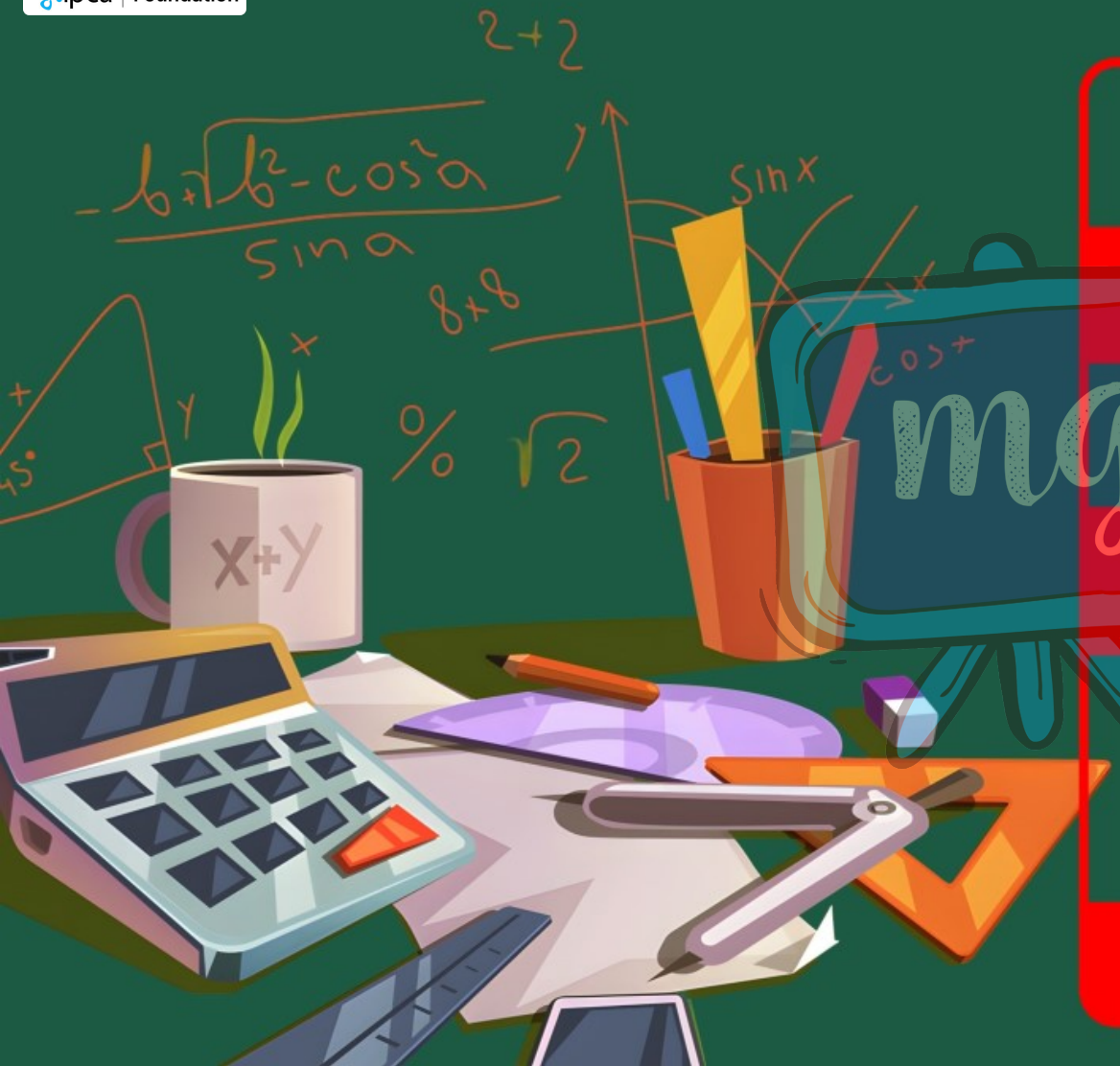

CLASS – 10

MATHEMATICS

Chapter – 5

Arithmetic Progressions

Part – 2

EXERCISE 5.1 (Q.1–3)

Shubham Tiwari

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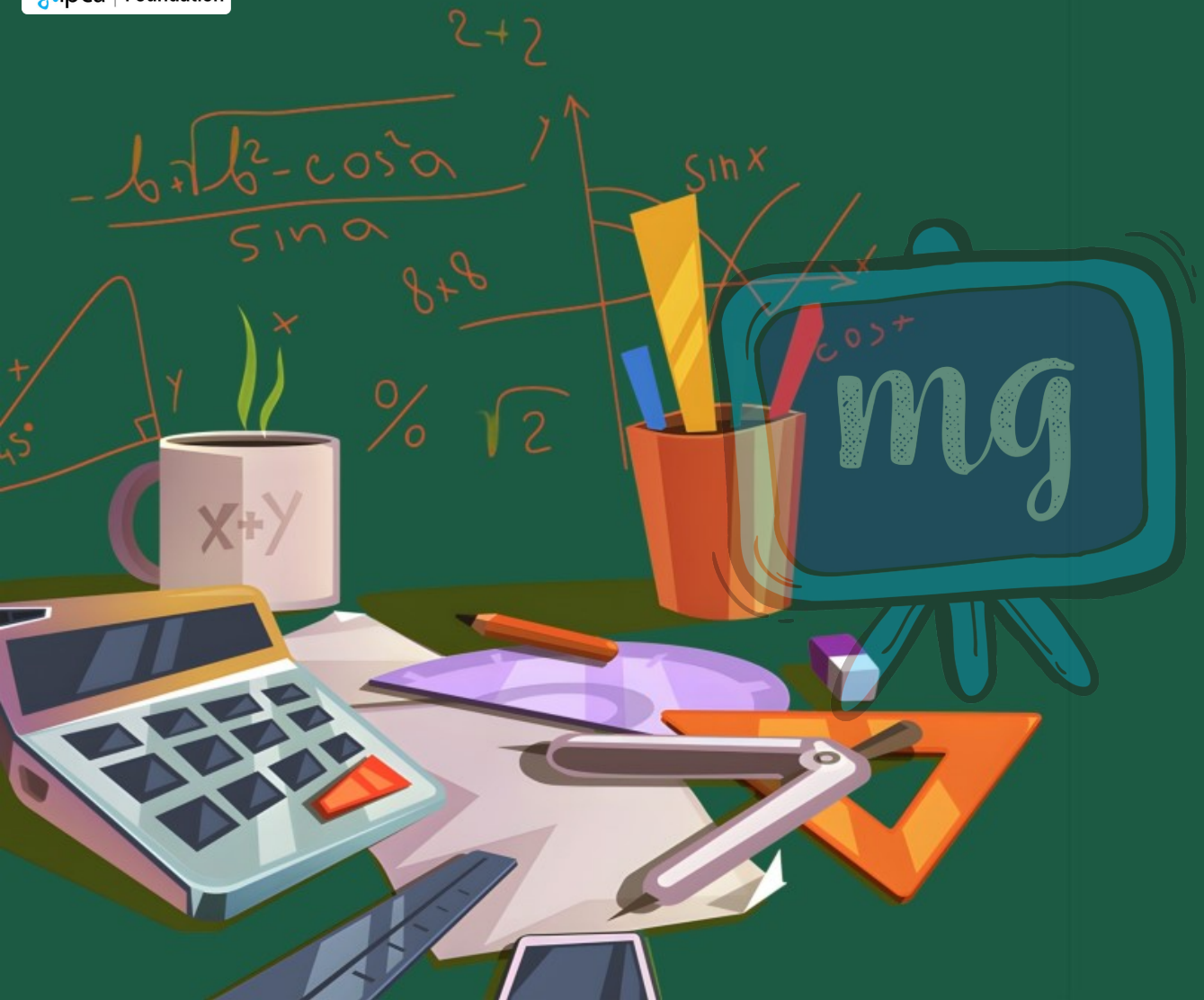
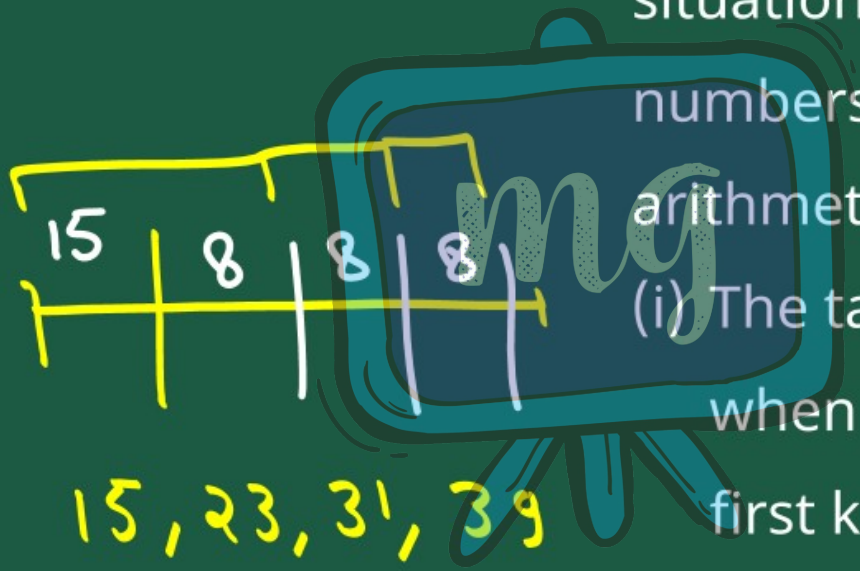


EXERCISE 5.1

1. In which of the following situations, does the list of numbers involved make an arithmetic progression, and why?

(i) The taxi fare after each km when the fare is ₹ 15 for the first km and ₹ 8 for each additional km.



Let's compare the terms by

$a_1, a_2, a_3, a_4 - —$

15, 23, 31, 39

$d_1 = a_2 - a_1$

$= 23 - 15$

$d_1 = 8$

$d_2 = 31 - 23$

$d_2 = 8$

$d_3 = 39 - 31$

$d_3 = 8$

as the Commondiff is same, the given terms are in AP.

(ii) The amount of air present in a cylinder when a vacuum pump removes $\frac{1}{4}$ of the air remaining in the cylinder at a time.

16 u.

$16 \times \frac{1}{4} = 4$

$16 - 4 = 12$

$12 \times \frac{1}{4} = 3$

$12 - 3 = 9$

1 2 3

$16, 12, 9$

As $d_1 \neq d_2$

Hence it is not an AP.

$d_1 = a_2 - a_1$

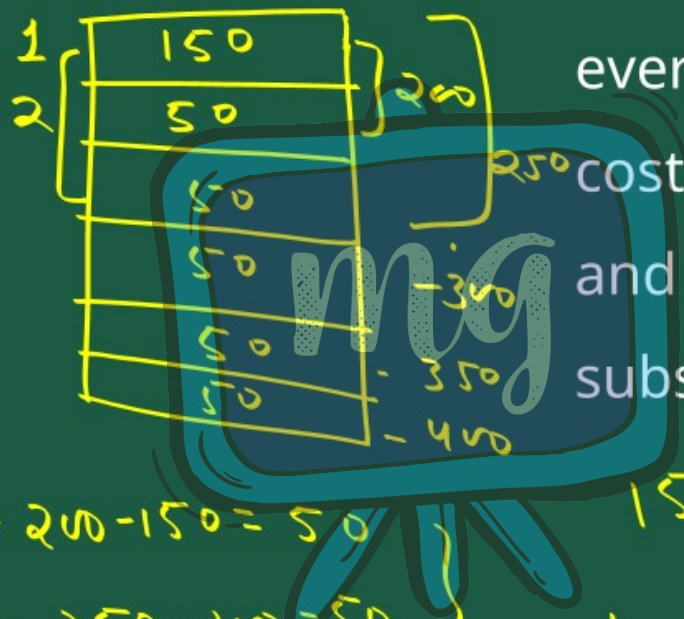
$= 12 - 16$

$d_1 = -4$

$d_2 = 9 - 12$

$d_2 = -3$

(iii) The cost of digging a well after every metre of digging, when it costs ₹ 150 for the first metre and rises by ₹ 50 for each subsequent metre.



$d_1 = 200 - 150 = 50$

$d_2 = 250 - 200 = 50$

$d_3 = 300 - 250 = 50$

150, 200, 250, 300

$d_1 = d_2 = d_3 = 50$

Hence it is an AP.

(iv) The amount of money in the account every year, when ₹ 10000 is deposited at compound interest at 8% per annum.

$1 = 10000 \times \frac{8}{100} = 800$

$10800 \times \frac{108}{100} = 11664$

10,000, 10,800, 11,664

a_1, a_2, a_3

$d_1 = a_2 - a_1$

$d_1 = 10800 - 10000$

$d_1 = 800$

$d_2 = a_3 - a_2$

$d_2 = 11664 - 10800$

$d_2 = 864$

$d_1 \neq d_2$

It is not an AP.

2. Write first four terms of the AP, when the first term a and the common difference d are given as follows :

(i) a = 10, d = 10

Hence the first four terms are 10, 20, 30, 40

$a_1 = a$ | $a_1 = 10$

$a_2 = a + d$ | $a_2 = 20$

$a_3 = a + 2d$ | $a_3 = 10 + 20 = 30$

$a_4 = a + 3d$ | $a_4 = 10 + 30 = 40$

(ii) $a = -2$, $d = 0$

$a_1 = a = -2$

$a_2 = a + d = -2 + 0 = -2$

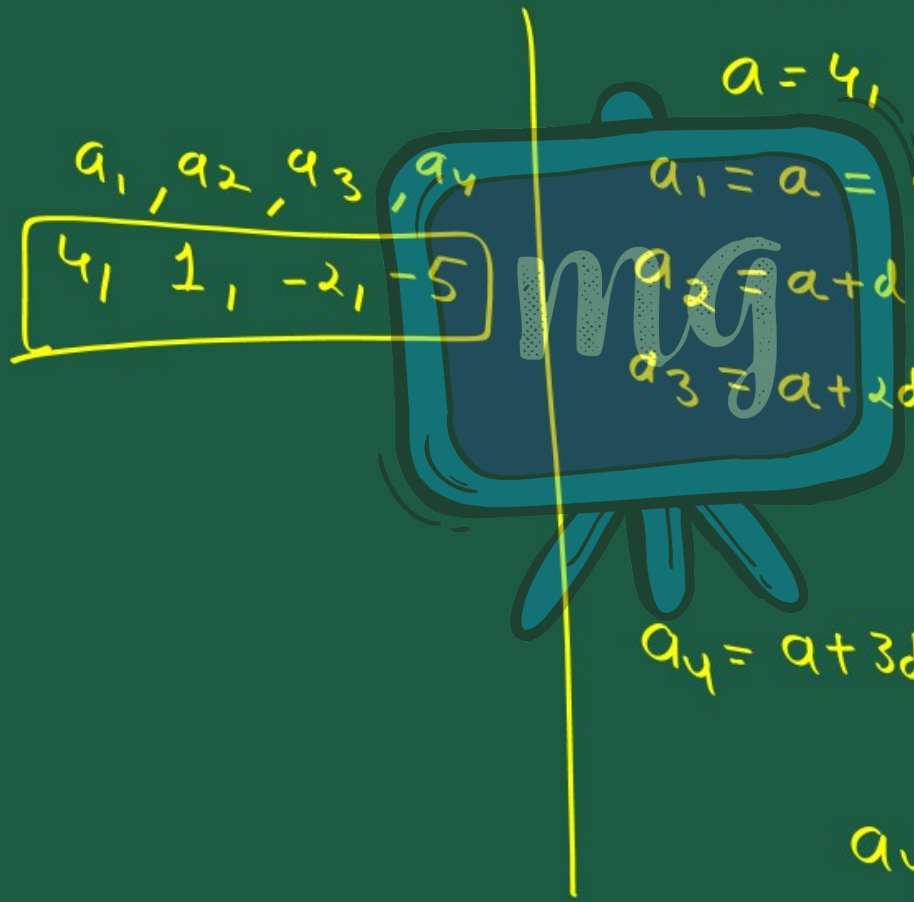
$a_3 = a + 2d = -2 + 0 = -2$

$a_4 = a + 3d = -2 + 0 = -2$

a_1, a_2, a_3, a_4

$-2, -2, -2, -2$

(iii) a = 4, d = −3



$a = 4, \quad d = -3$

a_1, a_2, a_3, a_4

4, 1, −2, −5

$a_1 = a = 4$

$a_2 = a + d = 4 - 3 = 1$

$a_3 = a + 2d = 4 + 2 \times (-3)$

$= 4 - 6$

$= -2$

$a_4 = a + 3d = 4 + 3(-3)$

$= 4 - 9$

$a_4 = -5$

(iv) $a = -1$, $d = \frac{1}{2}$

$-1, -\frac{1}{2}, 0, \frac{1}{2}$

$a_1 = a = -1$

$a_2 = a + d = -1 + \frac{1}{2} = -\frac{1}{2}$

$a_3 = a + 2d = -1 + 2 \times \frac{1}{2}$

$= -1 + 1 = 0$

$a_4 = a + 3d = -1 + 3 \times \frac{1}{2}$

$= -1 + \frac{3}{2}$

$a_4 = \frac{1}{2}$

(v) a = −1.25, d = −0.25

$a_1 = -1.25$

$a_2 = a + d = -1.25 + (-0.25)$

$= -1.25 - 0.25$

$a_2 = -1.5$

$a_3 = a + 2d = -1.25 + 2 \times (-0.25)$

$= -1.25 + (-0.5)$

$= -1.25 - 0.50$

$a_3 = -1.75$

$a_4 = a + 3d$

$= -1.25 + 3(-0.25)$

$= -1.25 + -0.75$

$= -1.25 - 0.75$

$a_4 = -2.00$

a_1, a_2, a_3, a_4

$-1.25, -1.5, -1.75, -2$

3. For the following APs, write the first term and the common difference:

(i) 3, 1, –1, –3, . . .

$a_1 = 3$

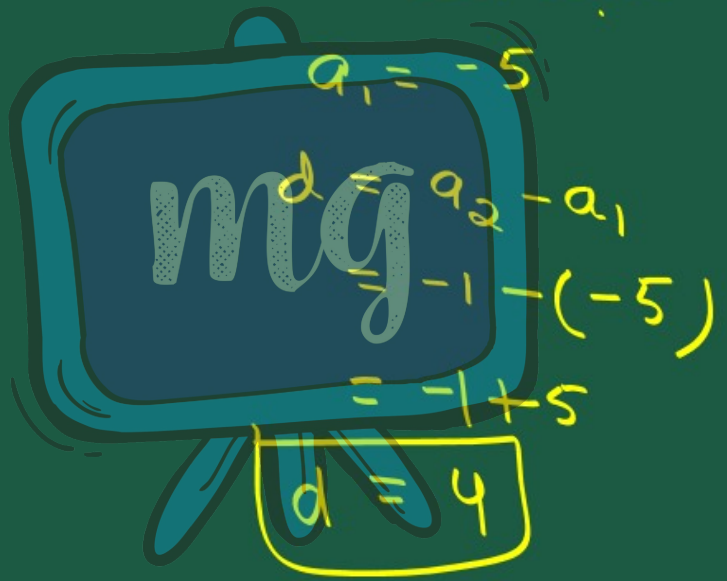
$d = a_2 - a_1$

$d = 1 - 3$

$d = -2$

Hence the first term is 3 and the common diff is -2.

(ii) $-5, -1, 3, 7, \ldots$



(iii) $\frac{1}{3}, \frac{5}{3}, \frac{9}{3}, \frac{13}{3}, \ldots\ldots$

(iv) 0.6, 1.7, 2.8, 3.9, . . .