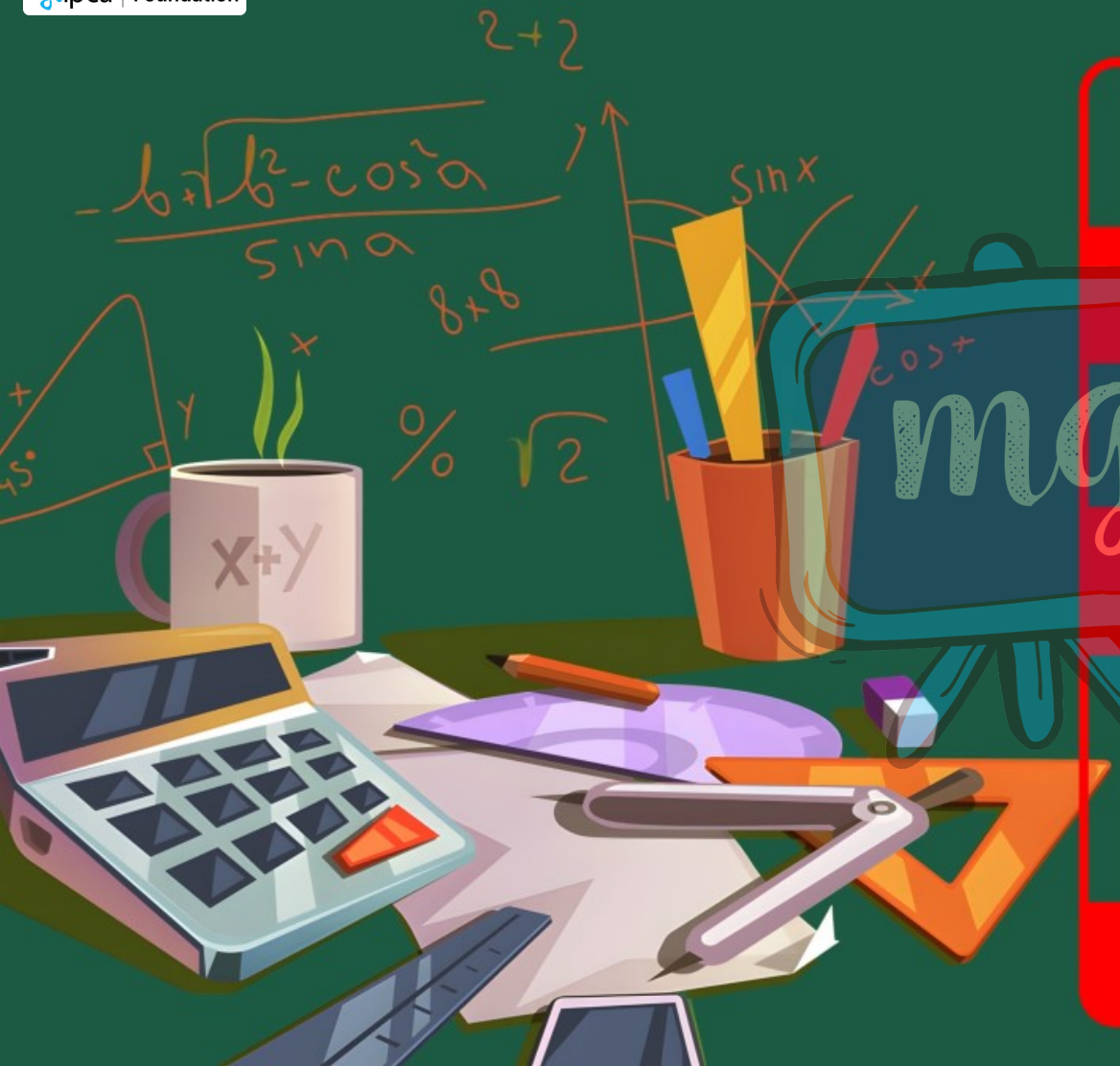
Under CSR Support by ipca | Foundation

missiongyan



CLASS – 10

MATHEMATICS

Chapter – 5

Arithmetic Progressions

Part – 10

EXERCISE 5.3 (Q.1 – 2)

Shubham Tiwari

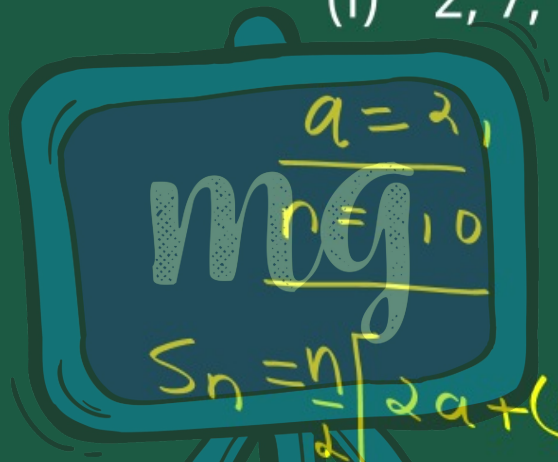
EXERCISE 5.3

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

$$S_n = \frac{n}{2}[a + l]$$

1. Find the sum of the following APs :

(i) 2, 7, 12, . . ., to 10 terms.



$a = 2$, $d = 7 - 2 = 5$, $n = 10$

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

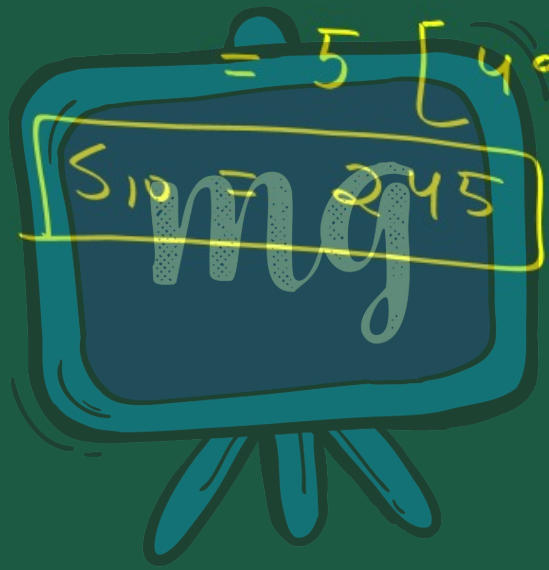
$$S_{10} = \frac{10}{2}\left[2 \times 2 + (10-1)5\right]$$

$$= 5\left[4 + 9 \times 5\right]$$

$$S_{10} = 5\left[4 + 45\right]$$

$$= 5\left[49\right]$$

$$S_{10} = 245$$



(ii) $-37, -33, -29, \ldots$, to 12 terms.

$a = -37, \quad d = -33 - (-37)$

$= -33 + 37$

$a = -37 \mid d = 4 \mid n = 12$

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

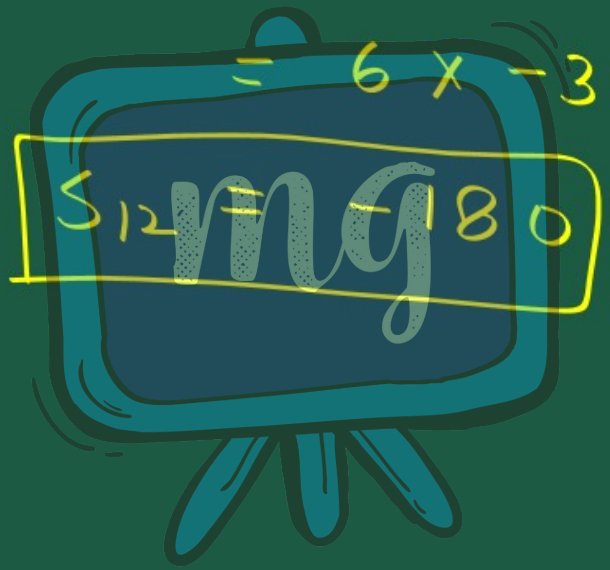
$S_{12} = \frac{12}{2}[2 \times (-37) + (12-1)\,4]$

$= 6[-74 + 11 \times 4]$

$$S_{12} = 6[-74 + 44]$$

$$= 6 \times -30$$

$$S_{12} = -180$$



(iii) 0.6, 1.7, 2.8, . . ., to 100 terms.

$a = 0.6$ | $d = a_2 - a_1$ | $n = 100$

$= 1.7 - 0.6$

$d = 1.1$

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

$= \frac{100}{2}[2 \times 0.6 + 99 \times 1.1]$

$= 50[1.2 + 99 \times 1.1]$

$= 50\left[1.2 + 99 \times 1.1\right]$

$= 50\left[1.2 + 108.9\right]$

$= 50\left[110.1\right]$

$= 5(1101)$

$S_{100} = 5505$

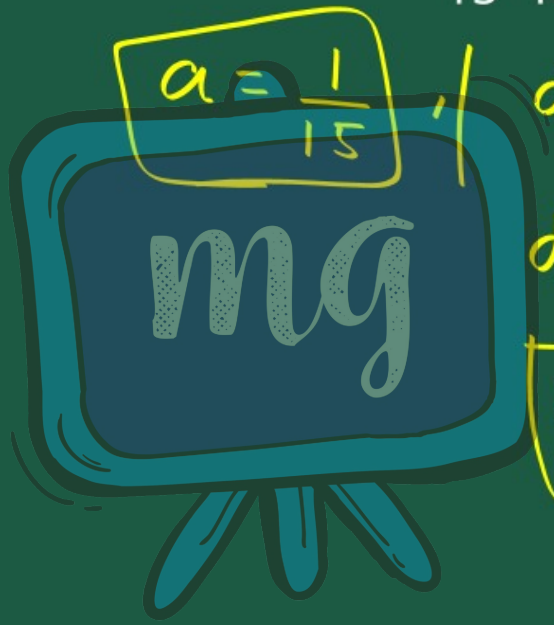
99×1.1

$1 \quad 9$

$9 \quad 89$

108.9

(iv) $\frac{1}{15}, \frac{1}{12}, \frac{1}{10}, \ldots\ldots$, to 11 terms



$a = \frac{1}{15}$

$d = \frac{1}{12} - \frac{1}{15}$

$n = 11$

$d = \frac{5 - 4}{60}$

$d = \frac{1}{60}$

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

$$S_{11} = \frac{11}{2}\left[2\times\frac{1}{15} + (11-1)\frac{1}{60}\right]$$

$$= \frac{11}{2}\left[\frac{2}{15} + \frac{10}{60}\right]$$

$$= \frac{11}{2}\left[\frac{2}{15} + \frac{1}{6}\right]$$

$$= \frac{11}{2}\left[\frac{4+5}{30}\right]$$

$$= \frac{11}{2}\left[\frac{9}{30}\right]$$

$$\frac{11\times 9}{30\times 2} = \frac{99}{60}$$

$$S_{11} = \frac{99}{60} = \frac{33}{20}$$

$$\boxed{S_{11} = \frac{33}{20}}$$

2. Find the sums given below :

(i) $7 + 10\frac{1}{2} + 14 + ... + 84$

$a = 7, \quad d = 10\frac{1}{2} - 7 = 3\frac{1}{2}, \quad a_n = 84$

$a_n = a + (n-1)d$

$84 = 7 + (n-1)\frac{7}{2}$

$84 = 7\left[1 + (n-1)\frac{1}{2}\right]$

$$\frac{84}{7} = 1 + (n-1)\frac{1}{2}$$

$$12 = 1 + (n-1)\frac{1}{2}$$

$$11 = (n-1)\frac{1}{2}$$

$$22 = n - 1$$

$$22 + 1 = n$$

$$23 = n$$

$$S_{23} = \frac{23}{2}[a+l]$$

$\frac{n}{2}(a+l)$

$$= \frac{23}{2}[7+84]$$

$$= \frac{23}{2}[91]$$

$$= \frac{23 \times 91}{2}$$

$$= \frac{2093}{2}$$

$$S_{23} = 1046\frac{1}{2}$$

(ii) $34 + 32 + 30 + \ldots + 10$

$a = 34$ | $d = 32 - 34 = -2$ |

$a_n = 10$

$a_n = a + (n-1)d$

$10 = 34 + (n-1)(-2)$

$-24 = (n-1)(-2)$

$\frac{-24}{-2} = (n-1)$

$12 = (n-1)$

$13 = n$

$$S_{13} = \frac{13}{2}\left[a + l\right]$$

$$= \frac{13}{2}\left[1 + 34\right]$$

$$= \frac{13}{2}\left[35\right]$$

$$= 13 \times 22$$

$$22 = 2 \times 11$$

$$26 \times 11$$

$$2 \quad 8 \quad 6$$

$$286 = S_{13}$$

(iii) $-5 + (-8) + (-11) + \ldots + (-230)$

$a = -5$, $d = -8 - (-5)$

$d = -3$

$a_n = -230$

$a_n = -230$

$a_n = a + (n-1)d$

$-230 = -5 + (n-1)(-3)$

$-230 + 5 = (n-1)(-3)$

$-225 = (n-1)-3$

$\frac{+225}{+3} = (n-1)$

$75 = n-1$

$76 = n$

$$S_{76} = \frac{76}{2}\left[a + l\right]$$

$$= \frac{76}{2}\left[(-5) + (-230)\right]$$

$$= \frac{76}{2}\left[-235\right]$$

$$= 38\left[-235\right]$$

$$S_{76} = 19\left[-470\right]$$

$$19 \times -470$$

$$S_{76} = -8930$$