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कक्षा - 10

गणित

अध्याय - 5

समांतर श्रेढ़ियाँ

भाग - 2

केशव शर्मा

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Q.2 दी हुई A.P. के प्रथम चार पद लिखिए, जबकि प्रथम पद a और सार्व अंतर d निम्नलिखित हैं:

(ii) a = – 2, d = 0

$a_1 = -2$

$a_2 = a_1 + d$

$a_2 = -2 + 0 = -2$

$a_3 = a_2 + d$

$a_3 = -2 + 0 = -2$

$a_4 = a_3 + d$

$= -2 + 0 = -2$

A.P. के प्रथम चार पद

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

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$a \quad a+d$

$a_1, a_2, a_3, a_4, \ldots$

$d = a_2 - a_1$

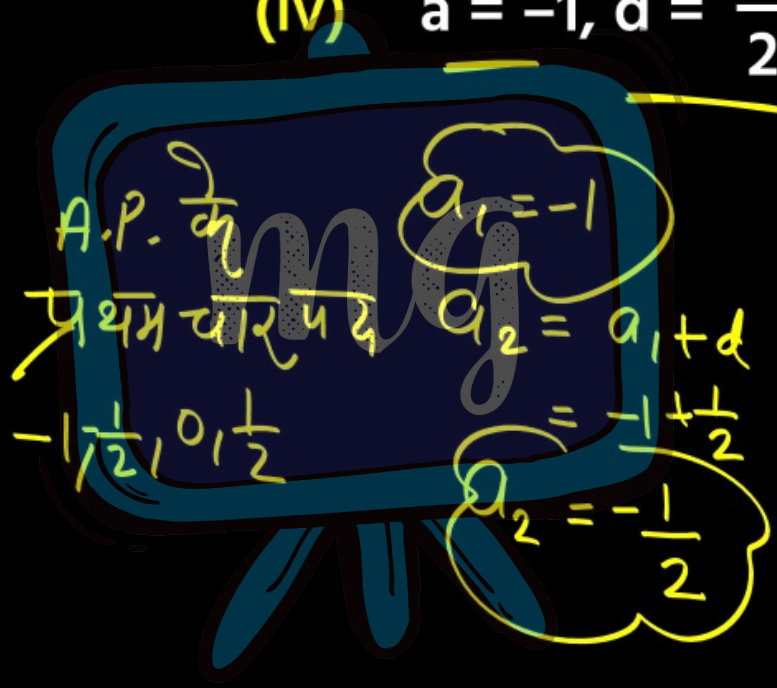
$d = a_{n+1} - a_n$

$a_2 = a_1 + d$

$a_3 = a_2 + d$

$a_4 = a_3 + d$

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



A.P. के प्रथम चार पद

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

$a_1 = -1$

$a_2 = a_1 + d$

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

$a_2 = -\frac{1}{2}$

$a_3 = a_2 + d$

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

$a_3 = 0$

$a_4 = a_3 + d$

$= 0 + \frac{1}{2}$

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

(v) a = –1.25, d = –0.25

$a_1 = -1.25$

$a_2 = a_1 + d$

$a_2 = -1.25 + (-0.25)$

$= -1.25 - 0.25$

$a_2 = -1.50$

$a_3 = a_2 + d$

$= -1.50 + (-0.25)$

$a_3 = -1.50 - 0.25 = -1.75$

$a_4 = a_3 + d$

$= -1.75 + (-0.25)$

$a_4 = -2.00$

$- \times - = +$

$-5 \times -5 = 25$

$-5 - 5 = -10$

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Q.3 निम्नलिखित में से प्रत्येक A.P. के लिए प्रथम पद तथा सार्व अंतर लिखिए :

(i) 3, 1, −1, −3,...

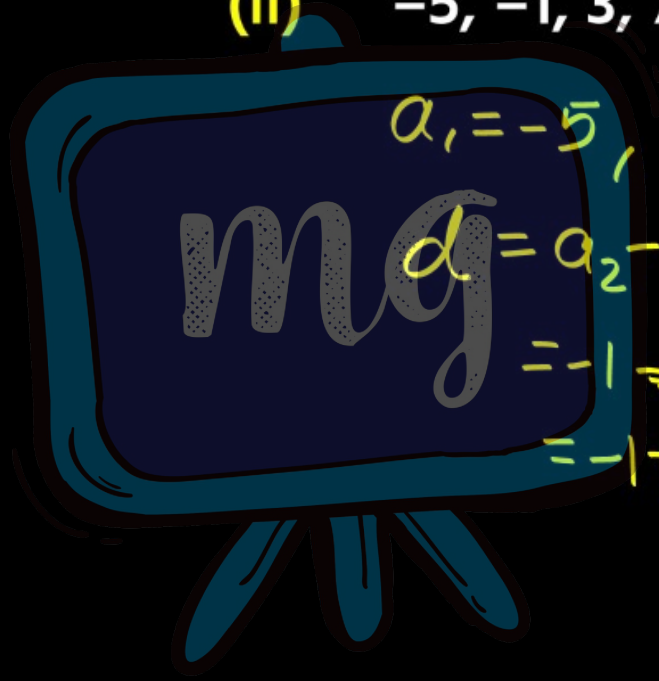
$a_1 = 3$

$a_2 = 1$

$d = a_2 - a_1$

$d = 1 - 3 = -2$

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



$a_1 = -5, \quad a_2 = -1$

$d = a_2 - a_1$

$= -1 - (-5)$

$= -1 + 5 = 4$

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

$a_1 = \frac{1}{3}$, $a_2 = \frac{5}{3}$

$d = a_2 - a_1$

$= \frac{5}{3} - \frac{1}{3} = \frac{5-1}{3} = \frac{4}{3}$

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

$a_1 = 0.6$, $a_2 = 1.7$

$d = a_2 - a_1$

$= 1.7 - 0.6$

$d = 1.1$

Q.4 निम्नलिखित में से कौन-कौन A.P. हैं? यदि कोई A.P. है, तो इसका सार्व अंतर ज्ञात कीजिए और इनके तीन और पद लिखिए।

$d_1 \neq d_2$

अतः दी गयी सूची AP नहीं है।

(i) 2, 4, 8, 16....

a_1 a_2 a_3 a_4

$a_1 = 2, a_2 = 4, a_3 = 8, a_4 = 16$

$d_1 = a_2 - a_1 = 4 - 2 = 2$

$d_2 = a_3 - a_2 = 8 - 4 = 4$

(iii) $-1.2, -3.2, -5.2, -7.2, \ldots\ldots$

$a_1 = -1.2,\ a_2 = -3.2,\ a_3 = -5.2$

$a_4 = -7.2$

$d_1 = a_2 - a_1 = -3.2 - (-1.2)$

$= -3.2 + 1.2 = -2.0$

$d_2 = a_3 - a_2 = -5.2 - (-3.2)$

$= -5.2 + 3.2 = -2.0$

$d_3 = a_4 - a_3$

$= -7.2 - (-5.2)$

$= -7.2 + 5.2$

$d_3 = -2.0$

$\boxed{d_1 = d_2 = d_3}$

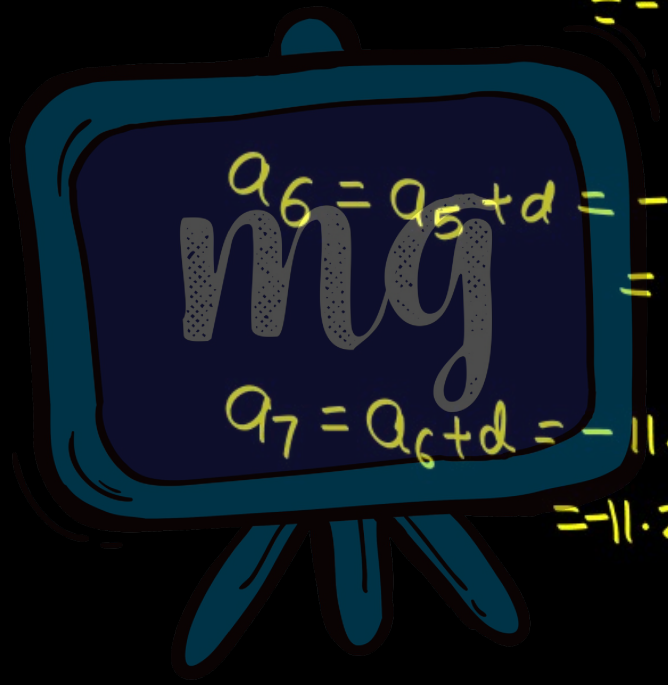
अतः यह AP है

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$a_5 = a_4 + d = -7.2 + (-2.0)$

$= -7.2 - 2.0 = -9.2$



$a_6 = a_5 + d = -9.2 + (-2.0)$

$= -9.2 - 2.0 = -11.2$

$a_7 = a_6 + d = -11.2 + (-2.0)$

$= -11.2 - 2.0 = -13.2$

(v) $3, 3+\sqrt{2}, 3+2\sqrt{2}, 3+3\sqrt{2}, \ldots$

$\sqrt{11}+\sqrt{11}=2\sqrt{11}$

$\sqrt{11}+\sqrt{13}$

$\sqrt{2}+\sqrt{3}$

$\sqrt{2}\times\sqrt{8}=\sqrt{16}$

$a_1=3,\ a_2=3+\sqrt{2},\ a_3=3+2\sqrt{2}$

$a_4=3+3\sqrt{2}$

$d_1=a_2-a_1=3+\sqrt{2}-3=\sqrt{2}$

$d_2=a_3-a_2=3+2\sqrt{2}-(3+\sqrt{2})$

$=3+2\sqrt{2}-3-\sqrt{2}$

$=2\sqrt{2}-\sqrt{2}=\sqrt{2}$

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$d_3 = a_4 - a_3$

$= 3 + 3\sqrt{2} - (3 + 2\sqrt{2})$

$d_3 = 3 + 3\sqrt{2} - 3 - 2\sqrt{2} = \sqrt{2}$

$d_1 = d_2 = d_3$

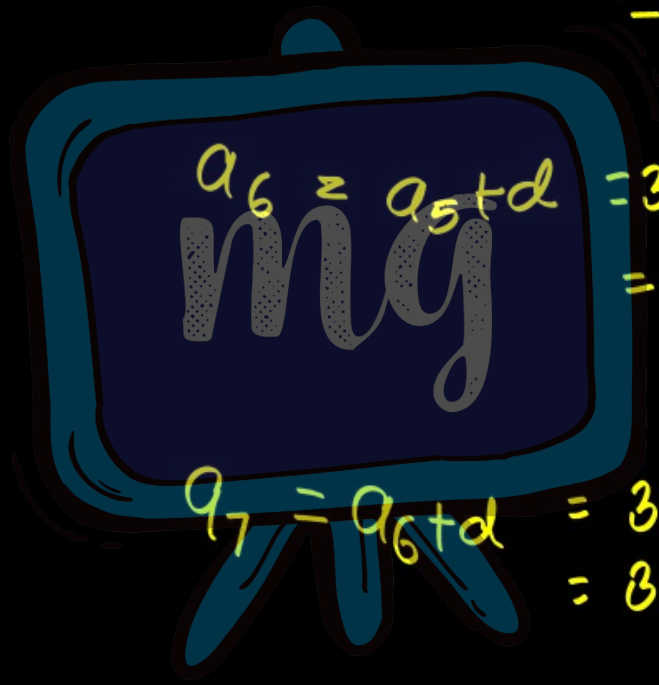
अतः यह AP है।

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$a_5 = a_4 + d = 3 + 3\sqrt{2} + \sqrt{2}$

$= 3 + 4\sqrt{2}$



$a_6 = a_5 + d = 3 + 4\sqrt{2} + \sqrt{2}$

$= 3 + 5\sqrt{2}$

$a_7 = a_6 + d = 3 + 5\sqrt{2} + \sqrt{2}$

$= 3 + 6\sqrt{2}$

(vi) 0.2, 0.22, 0.222, 0.2222, ...

$$0.22 - 0.20 = 0.02$$

$$0.222 - 0.220 = 0.002$$

$a_1 = 0.2$

$a_2 = 0.22$

$a_3 = 0.222$

$a_4 = 0.2222$

$d_1 = a_2 - a_1 = 0.22 - 0.2 = 0.02$

$d_2 = a_3 - a_2 = 0.222 - 022 = 0.002$

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$d_1 \neq d_2$

अतः यह AP नहीं है।



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(x) a, 2a, 3a, 4a, ...

$a_1 = a_1$ $a_2 = 2a_1$ $a_3 = 3a_1$

$a_4 = 4a$

$d_1 = d_2 = d_3$

अतः यह AP है।

$d_1 = a_2 - a_1 = 2a - a$

$= a$

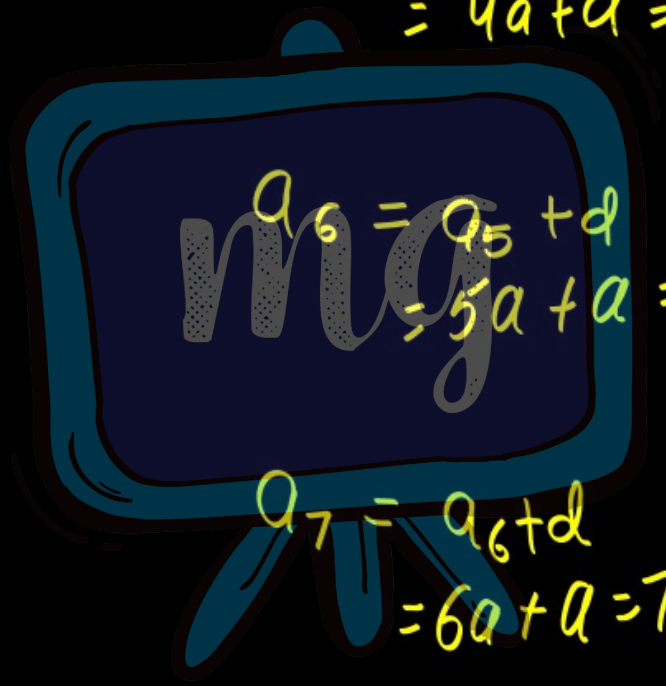
$d_2 = a_3 - a_2 = 3a - 2a = a$

$d_3 = a_4 - a_3 = 4a - 3a = a$

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$$a_5 = a_4 + d$$
$$= 4a + a = 5a$$



$$a_6 = a_5 + d$$
$$= 5a + a = 6a$$

$$a_7 = a_6 + d$$
$$= 6a + a = 7a$$

(xi) $a, a^2, a^3, a^4, \ldots$

$a_1 = a_1 \quad a_2 = a^2, \quad a_3 = a^3, \quad a_4 = a^4$

$d_1 \neq d_2$

अतः यह AP नहीं है

$d_1 = a_2 - a_1$

$= a^2 - a = a(a-1)$

$d_2 = a_3 - a_2$

$= a^3 - a^2 = a^2(a-1)$

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(xii) $\sqrt{2}, \sqrt{8}, \sqrt{18}, \sqrt{32}, \ldots$

$a_1 = \sqrt{2}$

$a_2 = \sqrt{8} = \sqrt{4 \times 2} = 2\sqrt{2}$

$a_3 = \sqrt{18} = \sqrt{9 \times 2} = 3\sqrt{2}$

$a_4 = \sqrt{32} = \sqrt{16 \times 2} = 4\sqrt{2}$

$d_1 = a_2 - a_1 = 2\sqrt{2} - \sqrt{2} = \sqrt{2}$

$d_2 = a_3 - a_2 = 3\sqrt{2} - 2\sqrt{2} = \sqrt{2}$