RD SHARMA

Solutions

Class 10 Maths

Chapter 9

Ex 9.3

1. Find:

(i) 10^{th} term of the AP 1,4 , 7, 10….

(ii) 18^{th} term of the AP $\sqrt{2}, 3\sqrt{2}, 5\sqrt{2}, \ldots\ldots\ldots$

(iii) nth term of the AP $13, 8, 3, -2, \ldots\ldots\ldots$

(iv) 10^{th} term of the AP $-40, -15, 10, 35, \ldots\ldots\ldots$

(v) 8^{th} term of the AP 11, 104, 91, 78……

(vi) 11^{th} term of the AP 10.0, 10.5, 11.0, 11.2…….

(vii) 9^{th} term of the AP $\frac{3}{4}, \frac{5}{4}, \frac{7}{4} + \frac{9}{4}, \ldots\ldots\ldots$

Sol:

(i) Given $A.p$ is

$1,4,7,10,.....$

First term $(a)=1$

Common difference (d) = second term first term

$=4-1$

$=3.$

n^{th} term in an $A.p=a+(n-1)d$

10^{th} term in an $1+(10-1)3$

$=1+9.3$

$=1+27$

$=28$

(ii) Given $A.p$ is

$\sqrt{2},3\sqrt{2},5\sqrt{2},.....$

First term $(a)=\sqrt{2}$

Common difference = Second term – First term

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

$d=2\sqrt{2}$

n^{th} term in an $A.p=a+(n-1)d$

18^{th} term of $A.p=\sqrt{2}+(18-1)2\sqrt{2}$

$=\sqrt{2}+17.2\sqrt{2}$

$=\sqrt{2}(1+34)$

$=35\sqrt{2}$

$\therefore 18^{th}$ term of $A.p$ is $35\sqrt{2}$

(iii) Given $A.p$ is

$13,8,3,-2,.....$

First term $(a)=13$

Common difference $(d)=$ Second term first term

$=8-13$

$=-5$

n^{th} term of an $A.p$ $a_n=a+(n-1)d$

$=13+(n-1)-5$

$=13-5n+5$

$a_n = 18 - 5n$

(iv) Given $A.p$ is

$-40, -15, 10, 35, ...$

First term $(a) = -40$

Common difference $(d) =$ Second term – first term

$= -15 - (-40)$

$= 40 - 15$

$= 25$

n^{th} term of an $A.p$ $a_n = a + (n-1)d$

10^{th} term of $A.p$ $a_{10} = -40 + (10-1)25$

$= -40 + 9.25$

$= -40 + 225$

$= 185$

(v) Given sequence is

$117, 104, 91, 78, ...$

First learn can $= 117$

Common difference $(d) =$ Second term – first term

$= 104 - 117$

$= -13$

n^{th} term $a_n = a + (n-1)d$

8^{th} term $a_8 = a + (8-1)d$

$= 117 + 7(-13)$

$= 117 - 91$

$= 26$

(vi) Given $A.p$ is

$10.0, 10.5, 11.0, 11.5, \ldots\ldots$

First term $(a) = 10.0$

Common difference (d) = Second term – first term

$= 10.5 - 10.0$

$= 0.5$

n^{th} term $a_n = a + (n-1)d$

11^{th} term $a_{11} = 10.0 + (11-1)0.5$

$= 10.0 + 10 \times 0.5$

$= 10.0 + 5$

$=15.0$

(vii) Given $A.p$ is

$\frac{3}{4},\frac{5}{4},\frac{7}{4}+\frac{9}{4},.....$

First term $(a)=\frac{3}{4}$

Common difference (d) = Second term – first term

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

$=\frac{2}{4}$

n^{th} term $a_n=a+(n-1)d$

9^{th} term $a_9=a+(9-1)d$

$=\frac{3}{4}+8.\frac{2}{4}$

$=\frac{3}{4}+\frac{16}{4}$

$=\frac{19}{4}$

2. (i) Which term of the AP 3, 8, 13, …. is 248?
(ii) Which term of the AP 84, 80, 76, … is 0?
(iii) Which term of the AP 4, 9, 14, …. is 254?
(iv) Which term of the AP 21, 42, 63, 84, … is 420?
(v) Which term of the AP 121, 117, 113, … is its first negative term?

Sol:

(i) Given $A.p$ is 3,8,13,.....

First term $(a) = 3$

Common difference (d) = Second term – first term

$= 8 - 3$

$= 5$

n^{th} term $(a_n) = a + (n-1)d$

Given n^{th} term $a_n = 248$

$248 = 3 + (n-1).5$

$248 = -2 + 5n$

$5n = 250$

$$n = \frac{250}{5} = 50$$

50^{th} term is 248.

(ii) Given $A.p$ is $84, 80, 76, \ldots\ldots$

First term $(a) = 84$

Common difference $(d) = a_2 - a$

$= 80 - 84$

$= -4$

n^{th} term $(a_n) = a + (n-1)d$

Given n^{th} term is 0

$0 = 84 + (n-1) - 4$

$+84 = +4(n-1)$

$$n - 1 = \frac{\cancel{84}^{21}}{4} = 21$$

$n = 21 + 1 = 22$

22^{nd} term is 0.

(iii) Given $A.p$ $4, 9, 14, \ldots\ldots$

First term $(a) = 4$

Common difference $(d) = a^2 - a$

$= 9 - 4$

$= 5$

n^{th} term $(a_n) = a + (n-1)d$

Given n^{th} term is 254

$4+(n-1)5=254$

$(n-1)\cdot 5=250$

$n-1=\frac{250}{5}=50$

$n=51$

$\therefore 51^{st}$ term is 254.

(iv) Given $A.p$

$21,42,63,84,.....$

$a=21, d=a_2-a$

$=42-21$

$=21$

n^{th} term $(a_n) = a + (n-1)d$

Given n^{th} term $= 420$

$21 + (n-1)21 = 420$

$(n-1)21 = 399$

$n - 1 = \frac{399}{21} = 19$

$n = 20$

$\therefore 20^{th}$ term is 420.

(v) Given $A.p$ is 121,117,113,.....

First term $(a) = 121$

Common difference $(d) = 117 - 121$

$= -4$

n^{th} term $(a) = a + (n-1)d$

Given n^{th} term is negative i.e., $a_n < 0$

$121 + (n-1) - 4 < 0$

$121 + 4 - 4n < 0$

$125 - 4n < 0$

$4n > 125$

$n > \frac{125}{4}$

$n > 31.25$

The integer which comes after 31.25 is 32.

$\therefore 32^{nd}$ term is first negative term