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 $A.p$

$21, 42, 63, 84, \ldots\ldots$

$a=21, d=a_2-a$

$=42-21$

$=21$

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