31/7/21

1. Find the common difference of the A.P given below.

$$\frac{1}{2b}, \frac{1-6b}{2b}, \frac{1-12b}{2b} \ldots\ldots$$

2. The angles of a triangles are in A.P., the least being half the greatest. Find the angles.

3. The 9th term of an A.P. is equal to 6 times it's second term. If it's 5th term is 22, find the A.P.

4. The sum of the first seven terms of an A.P. is 182. If it's 4th and the 17th term are in the ratio 1:5, find the A.P.

5. Find the sum of all multiples of 7 lying between 500 and 900.

6. An Arithmetic Progression 5, 12, 19.... has 50 terms. Find the sum of it's last is 15.

7. Find the sum of all multiples of 9 lying between 400 and 800.

8. The sum of first n terms of an A.P. is $5n^2 + 3n$. If it's nth term is 168. Find the value of n also find the 20th term of this A.P.

9. If the sum of the first n terms of an A.P. is $\frac{1}{2}(3n^2 + 7n)$, then find it's 20th term.

Answers

1. Common diff - $a_2 - a_1$

$$= \frac{1-6b}{2b} - \frac{1}{2b}$$

$$= \frac{1-6b-1}{2b}$$

$$= \frac{-6b}{2b}$$

$$= \underline{\underline{-3}}$$

2. Smallest angle - 'x'
Largest angle - 2x

AP - $x, \frac{?}{}, 2x$

$a_2 - a_1 = a_3 - a_2$

$a_2 - x = 2x - a_2$

$2(a_2) = 3x$

$$a_2 = \frac{3}{2}x$$

$\angle 1 + \angle 2 + \angle 3 = 180°$

$a_1 + a_2 + a_3 = 180°$

$x + \frac{3}{2}x + 2x = 180°$

~~$9x$~~ =

$2x + 3x + 4x = 360°$

$9x = 360°$

$x = \frac{360}{9}$

$x = \underline{\underline{40°}}$

3. $a_5 = a + 4d = 22$

$a = 22 - 4d$

$a_9 = 6(a_2)$

$a + 8d = 6(a + d)$

$22 - 4d + 8d = 6(22 - 4d + d)$

$22 + 4d = 6(22 - 3d)$

$22 + 4d = 132 - 18d$

$4d + 18d = 132 - 22$

$22d = 110$

$d = \frac{110}{220}$

$d = 5$

$a = 22 - 4d$

$22 - 4(5)$

$22 - 20$

$= 2$

AP. 2, 7, 12 ...

4. $S_7 = 182^\circ$, $\frac{a_4}{a_{17}} = \frac{1}{15}$ $\longrightarrow$ $\frac{a + 3d}{a + 16d} = \frac{1}{5}$

$5a + 15d = a + 16d \Rightarrow 4a = d$ —

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

$S_{14} = \frac{7}{2}(2a + 6d)$

$182 = 7(a + 3d)$

$\therefore a + 3d = 26 \quad a + 3(4a) = 26$

$a + 12a = 26^{\circ}, \quad 13a = 26$

$a = 2$

$d = 4a = 4 \times 2 = 8$

A.P = 2, 10, 18, 26 ....

5. Multiples of 7 between 500 and 900

504, 511, 518 ——— 889, 896.

$a = 504, \quad d = 7, \quad l = 896$

$a_n = ?$

$a_n = 504 + (n-1) = 896$ ∴ divide by 7.

$72 + (n-1) = 128$

$71 + n = 128$

$n = 128 - 71$

$n = 57$

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

$S_{57} = \frac{57}{2}(504 + 896)$

$= \frac{57}{2}(1400)$

$= 57 \times 700$

$= 39900.$

6. AP = 5, 12, 19 ... upto 50 terms

$a_n = 2$ Sum of last 15 terms = ?

$$a_n = a + (n-1)d$$
$$= 5 + (50-1)7$$
$$= 5 + (49)7$$
$$= 348$$

We will reverse the series as we have to find sum of last 15 terms.

AP - 348 ..... 19, 12, 5.

$$S_{15} = \frac{15}{2}(2a + (n-1)d)$$
$$= \frac{15}{2}(2(348) + (15-1)(-7))$$
$$= \frac{15}{2}(696 + (14)(-7))$$
$$= \frac{15}{2}(696 - 98)$$
$$= \frac{15}{2}(598)$$
$$= 15 \times 299$$
$$S_{15} = 4485$$

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

$$792 = 405 + (n-1)9$$
$$387 = (n-1)9$$
$$n = 44$$

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

$= \frac{44}{2}(2 \times 405 + (44-1)9)$

$= 22(810 + 387)$

$= 22 \times 1197$

$= 26334$

8. $S_n = 5n^2 + 3n$

$S_1 = 5(1)^2 + 3(1)$

$a_1 = 8$

$a_2 = S_2 - S_1$

$= (5 \times 4 + 6) - 8)$

$= 26 - 8$

$= 18$

$d = 10$

$8 + (n-1)10 = 168$

$n - 1 = 16$

$n = 16 + 1$

$= 17$

$a_{20} = 8 + 19 \times 10$

$= 198$

9. $S_n = \frac{1}{2}(3n^2 + 7n)$

$= \frac{3n^2}{2} + \frac{7n}{2}$

$= \frac{3(n-1)^2}{2} + \frac{7(n-1)}{2}$

$= \frac{3(n^2 - 2n + 1)}{2} + \frac{7n - 7}{2}$

$\frac{3n^2 - 6n + 3 + 7n - 7}{2}$

$\frac{3n^2 + n - 4}{2}$

$a_n = S_n - S_{n-1}$

$= \frac{3n^2 + 7n}{2} - \frac{3n^2 + n + 4}{2}$

$= \frac{3n^2 + 7n - 3n^2 + n + 4}{2}$

$= \frac{6n + 4}{2}$

$= \frac{2(3n + 2)}{2}$

$3n + 2$ //

$a_n = 3n + 2$

$a_{20} = 3(20) + 2$

$= 60 + 2$

$= \underline{\underline{62}}$ //

31/7/21

Fill in the Blanks
[A.P]

1. Look for a pattern and fill in the blanks with the most likely choices for each sequence.

a) 1, 3, 4, 7, 11 31

b) 2, 8, 32, 128 552

c) 1, 9, 25, 49..... 97

2. 30th term of the A.P: 10, 7, 4 .... is -77

-3

3. 11th term of the A.P: $-3, -\frac{1}{2}, 2, \ldots$ is 22

4. Which term of the A.P: 3, 8, 13, 18 ..... is 78?
16th

5. Fill the missing terms in the following A.P.

(i) 2 , ___ , 26

(ii) ___ , 13 , ___ , 3

(iii) 5 , ___ , ___ , $9\frac{1}{2}$

6. Find the sums of the following A.P.

a) 2, 7, 12 ..... to 10 terms is ___

b) $\frac{1}{15}, \frac{1}{12}, \frac{1}{10}$ ... to 11 terms is ___

7) Fill the spaces below:-

(i) $a = 7$, $d = 3$, $n = 8$, $a_n =$ ____

(ii) $a = -18$, $d =$ ____, $n = 10$, $a_n = 0$

(iii) $a =$ ____, $d = -3$, $n = 18$, $a_n = -5$

8. The n^{th} value where $a = 18.9$, $d = 2.5$ and $a_n = 3.6$ is ____

9. a_n's value when $a = 3.5d$, $d = 0$ and $n = 105$ is ____

10. Complete the following formula

a) $d =$ ____ $- a_1$

b) $S_n = \frac{n}{2}(2a +$ ____ $d)$

c) $a_n =$ ____ $+ (n-1)d$

d) ____ $= \frac{n}{2}(a +$ ____ $)$