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Class: X
Subject: Maths
Topic: Arithmetic progression
No. of Questions: 20
Duration: 60 Min
Maximum Marks: 60

**Q1.** If the interior angles of a polygon are in A.P.with common difference 5° and the smallest angle is 120°, then the number of sides of the polygon are _____.
A. 9
B. 16
C. 9 or 16
D. 12

**Solution:** A
Let the polygon be having n sides
Using the formula of sum of interior angles of polygon
(n-2)*180= 120 + 125 + .... + 120 +(n-1)5
Solve the right side using formula of Sn and get the value of n.

**Q2.** In a given A.P., if the pth term is 'q' and the qth term is 'p', then its nth term is _____.
A. p + q - n
B. p + q + n
C. p - q + n
D. p - q - n

**Solution:** A
Let a be first term and d be common difference
q= a+ (p-1)d and p=a + (q-1)d
Solve 2 equations to get a and d
and get a+(n-1)d which is nth term.

**Q3.** If $X \neq Y$ and the sequence $x, a_1, a_2, y$ and $x, b_1, b_2, y$ each are in A.P., then $\frac{(a_2-a_1)}{(b_2-b_1)}$ is _____.
A. 32
B. 23
C. 1
D. 43

**Solution:** C
Cleraly a1=b1 and b2=a2
a2-a1=b2-b1 and hence C

**Q4.** If there are 'n' AM.'s between a and b, then common difference d is _____.

A. $\frac{b+a}{n+1}$

B. $\frac{b-a}{n+1}$

C. $\frac{b-a}{n}$

D. $\frac{b+a}{n}$

**Solution:** B
b with (n+2)th term
b= a+(n+2-1) d
d= (b-a)/n+1

**Q5.** If the sum of p terms of an A. P. is q and the sum of q terms is p, then the sum of p + q terms is _____.

A. 0
B. p - q
C. p +1
D. - (p + q)

**Solution:** D
Sp= p/2( 2a + (p-1)d)=q
Sq= q/2(2a + (q-1)d)=p
S(p+q)=(p+q)/2 (2a + (p+q-1)d)
Subtract 2nd equation from 1st on simplication you will get
(p+q-1)d= -2(1+a)
Substitue in third quation to answer.

**Q6.** If 'a' is the A.M. of 3 numbers and 'b' is the A.M. of their squares, then the A.M. of their pairwise products in terms of a and b is _____

A. $\frac{3a^2+b}{2}$

B. $\frac{3a^2-b}{2}$

C. $\frac{b-3a^2}{2}$

D. $\frac{b^2-3a^2}{2}$

**Solution:** B
For this best is to choose three numbers 1,2,3 get their AM and get the AM of their squares.
Proceed as asked in question and match the values by substituting the options.
Alternatively use identity $(a+b+c)^2$
a+b+c is given. Squares terms also given. Product term we have to find.

**Q7.** The $n^{th}$ term of the series $1^2$, $(1^2 + 2^2)$, $(1^2 + 2^2 + 3^2)$…….. is _____.

A. $n$

B. $\frac{n(n+1)}{2}$

C. $\frac{n^2(n+1)^2}{2}$

D. $\frac{n(n+1)(2n+1)}{6}$

**Solution:** D
Sum of square of first n terms.

**Q8.** If $b_1, b_2, b_3$,..... belongs to A.P. such that $b_1 + b_4 + b_7 + \ldots\ldots + b_{28} = 220$, then the value of $b_1 + b_2 + b_3 + \ldots\ldots\ldots + b_{28}$ equals _____.
A. 616
B. 308
C. 2,200
D. 1,232

**Solution:** A
If $b_1, b_2, b_3 \ldots\ldots b_n$ are in AP then
$b_1 + b_n = b_2 + b_{n-1} = b_3 + b_{n-2} \ldots\ldots\ldots\ldots (i)$
And $b_1 + b_4 + b_7 + \cdots + b_{28} = 220$
Now if $b_1 + b_2 + b_3 + \ldots\ldots\ldots$ (1)
So $b_1 + b_{28} = b_4 + b_{25} = \ldots\ldots$ And there will be 10 terms and total 5 pair so
$5(b_1 + b_{28}) = 220$
So $b_1 + b_{28} = 44$
Now in $b_1 + b_2 + b_3 + \ldots\ldots\ldots + b_{28}$ there are 14 pair
So $b_1 + b_2 + b_3 + \ldots\ldots + b_{28}$
$= 14(b_1 + b_{28}) = 14 \times 44$
$= 616$

**Q9.** In an A.P., if it is given that $t_{p+1} = 2t_{q+1}$, then, $t_{3p+1}$ is equal to _____.
A. $2t_{p+q+1}$
B. $2t_{p+q-1}$
C. $2t_{p-q+1}$
D. $2t_{p-q-1}$

**Solution:** A
Let first term be a and d be common difference
a+pd=2(a+qd)
pd= a+2qd
now t3p+1 = a + 3pd = a+2pd +pd
= a + 2pd + a+ 2qd = 2 (a + (p+q+1-1)d)

**Q10.** If the sums of n, 2n and 3n terms of an A.P are $S_1$, $S_2$ and $S_3$ respectively, then $\frac{S_3}{(S_2-S_1)}$ is _____.

A. 0
B. 1
C. 2
D. 3

**Solution:** D
Just find Sn, S2n and S3nin terms of a and d and solve the required expression.

**Q11.** If the $n^{th}$ term of an A.P. is 3n + 5, then sum of the 'n' terms is _____.

A. $\frac{3n^2+13n}{2}$
B. $\frac{3n^2-13n}{2}$
C. $\frac{n^2+13n}{2}$
D. $\frac{13^2+3n}{2}$

**Solution:** A
sum of n terms will be given by summation of nth term which will be 3n(n+1)/2 + 5n

**Q12.** A circle with area $A_1$ is contained in the interior of a larger circle with area $A_1 + A_2$. If the radius of the larger circle is 3 units and
A1, A2, A1 + A2 are in A.P., then the radius of the smaller circle is _____.

A. $\frac{\sqrt{3}}{2}$ units
B. 1 units
C. $\frac{2}{\sqrt{3}}$ units
D. $\sqrt{3}$ units

**Solution:** D
Let the radius of smaller circle be r
A1= pie*r^2
A2= 9pie - pie*r^2
A1+A2= 9pie
Just put these in Ap and get the r.

**Q13.** If $7^{th}$ and $13^{th}$ terms of an A.P. are 34 and 64 respectively, then its $18^{th}$ term is _____.

A. 87
B. 88
C. 89
D. 90

**Solution:** C
a+6d=34
a+ 12d= 64
Find a and d get 18th term.

**Q14.** If the first, second and last terms of an A.P. are a, b and 2a respectively, its sum is _____.

A. $\frac{ab}{2(b-a)}$

B. $\frac{ab}{b-a}$

C. $\frac{3ab}{2(b-a)}$

D. $\frac{2ab}{b-a}$

**Solution:** C
Common differnce= b-a
Total number in AP can be found
2a= a+ (n-1)d= a+ (n-1)(b-a)
(a/(b-a)) +1=n
n= b/b-a
Sum will be n/2(a+2a) = (b/b-a) (3a)/2= 3/2ab/(b-a)

**Q15.** If the sum of first n even natural numbers is equal to K times the sum of first n odd natural numbers, then K is equal to _____.

A. 1/n
B. $\frac{n-1}{n}$
C. $\frac{n+1}{2n}$
D. $\frac{n+1}{n}$

**Solution:** D
Sum of first 2n natural nunbers is can be found
Sum of first n even natural number can be found using a=2 d=2 and n=n
Subtract it from 2n natural numbers, it will give sum of odd numbers. Equate according to condition given in question and get the answer.

**Q16.** If four numbers are in A.P. such that their sum is 50 and the greatest number is 4 times the least, then the numbers are _____.
A. 5, 10, 15, 20
B. 4, 10, 16, 22
C. 3, 7, 11, 15
D. None of these

**Solution:** A
Let numbers be a-3d, a-d, a+d, a+3d
Given 4*(a-3d)=(a+3d)
a= 5d
Terms will be 2d,4d,6d,8d
Sum is given find d and get numbers.

**Q17.** The number of terms common between the two series 2 + 5 + 8 + ……. upto 50 terms and the series 3 + 5 + 7 + 9 + ……. upto 60 terms is _____.
A. 24
B. 26
C. 25
D. 20

**Solution:** D
Start from first term get the LCM of difference of two series and add it to 5 and find the numbers that are common
LCM of diff=6
after 5 next term is 11 then 17,23. . .Like this continue

**Q18.** If the ratio of the sums of n terms of two A.P.'s is (3n + 4): (5n + 6), then the ratio of their 5th term is _____.

A. $\frac{21}{31}$
B. $\frac{31}{41}$
C. $\frac{31}{51}$
D. $\frac{11}{31}$

**Solution:** C

**Q19.** If a, b, c are in A.P., then, $a^3 - 8b^3 + c^3$ is equal to _____.
A. 3b ($a^2 + c^2$)
B. 3b ($a^2 - c^2$)
C. 3b ($c^2 - a^2$)
D. None of these

**Solution:** D
2b = a + c
a^3 - $(2b)^3$ + $c^3$
Here a - 2b + c = 0
So value will be 3 (a) (-2b) (C) = -6abc

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Q20. Let $S_n$ denotes the sum of n terms of an AP., whose first term is a. If the common difference d is given by $d = S_n - KS_{n-1} + S_{n-2}$, then k is equal to _____.

A. 1
B. 2
C. 3
D. 4

Right Answer B