Mathematics

1.In an Arithmetic Progression, if a=28, d=-4, n=7, then a_n is:

(a)4

(b)5

(c)3

(d)7

Answer: **a**

Explanation: For an AP,

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

$= 28+(7-1)(-4)$

$= 28+6(-4)$

$= 28-24$

$a_n=4$

2.If a=10 and d=10, then first four terms will be:

(a)10,30,50,60

(b)10,20,30,40

(c)10,15,20,25

(d)10,18,20,30

Answer: **b**

Explanation: a = 10, d = 10

$a_1 = a = 10$

$a_2 = a_1+d = 10+10 = 20$

$a_3 = a_2+d = 20+10 = 30$

$a_4 = a_3+d = 30+10 = 40$

3.The first term and common difference for the A.P. 3,1,-1,-3 is:

(a)1 and 3

(b)-1 and 3

(c)3 and -2

(d)2 and 3

Answer: **c**

Explanation: First term, a = 3

Common difference, d = Second term – First term

⇒ 1 – 3 = -2

⇒ d = -2

4.30th term of the A.P: 10,7, 4, …, is

(a)97

(b)77

(c)-77

(d)-87

Answer: **c**

Explanation: Given,

A.P. = 10, 7, 4, …

First term, a = 10

Common difference, d = $a_2 - a_1 = 7-10 = -3$

As we know, for an A.P.,

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

Putting the values;

$a_{30} = 10+(30-1)(-3)$

$a_{30} = 10+(29)(-3)$

$a_{30} = 10-87 = -77$

5.11th term of the A.P. -3, -1/2, ,2 …. Is

(a)28

(b)22

(c)-38

(d)-48

Answer: **b**

Explanation: A.P. = -3, -1/2, ,2 …

First term a = – 3

Common difference, d = $a_2 - a_1$ = (-1/2) -(-3)

⇒(-1/2) + 3 = 5/2

Nth term;

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

Putting the values;

$a_{11} = 3+(11-1)(5/2)$

$a_{11} = 3+(10)(5/2)$

$a_{11} = -3+25$

$a_{11} = 22$

6.The missing terms in AP: __, 13, __, 3 are:

(a)11 and 9

(b)17 and 9

(c)18 and 8

(d)18 and 9

Answer: **(c)**

Explanation: $a_2 = 13$ and

$a_4 = 3$

The nth term of an AP;

$a_n = a+(n-1)\ d$

$a_2 = a +(2-1)d$

13 = a+d ……. (i)

$a_4 = a+(4-1)d$

3 = a+3d …….. (ii)

Subtracting equation (i) from (ii), we get,

– 10 = 2d

d = – 5

Now put value of d in equation 1

13 = a+(-5)

a = 18 (first term)

a_3 = 18+(3-1)(-5)

= 18+2(-5) = 18-10 = 8 (third term).

7. Which term of the A.P. 3, 8, 13, 18, … is 78?

(a)12th

(b)13th

(c)15th

(d)16th

Answer: **(d)**

Explanation: Given, 3, 8, 13, 18, … is the AP.

First term, a = 3

Common difference, d = $a_2 - a_1$ = 8 – 3 = 5

Let the nth term of given A.P. be 78. Now as we know,

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

Therefore,

78 = 3+(n –1)5

75 = (n–1)5

(n–1) = 15

n = 16

8.The 21st term of AP whose first two terms are -3 and 4 is:

(a)17

(b)137

(c)143

(d)-143

Answer: **b**

Explanation: First term = -3 and second term = 4

a = -3

d = 4-a = 4-(-3) = 7

a_{21}=a+(21-1)d

=-3+(20)7

=-3+140

=137

9. If 17th term of an A.P. exceeds its 10th term by 7. The common difference is:

(a)1

(b)2

(c)3

(d)4

Answer: **(a)**

Explanation: Nth term in AP is:

a_n = a+(n-1)d

a_{17} = a+(17−1)d

a_{17} = a +16d

In the same way,

a10 = a+9d

Given,

a17 − a10 = 7

Therefore,

(a +16d)−(a+9d) = 7

7d = 7

d = 1

Therefore, the common difference is 1.

10. The number of multiples of 4 between 10 and 250 is:

(a)50

(b)40

(c)60

(d)30

Answer: **(c)**

Explanation: The multiples of 4 after 10 are:

12, 16, 20, 24, …

So here, a = 12 and d = 4

Now, 250/4 gives remainder 2. Hence, 250 – 2 = 248 is divisible by 2.

12, 16, 20, 24, …, 248

So, nth term, a_n = 248

As we know,

a_n = a+(n−1)d

248 = 12+(n-1)×4

236/4 = n-1

59 = n-1

n = 60

11. 20th term from the last term of the A.P. 3, 8, 13, …, 253 is:

(a)147

(b)151

(c)154

(d)158

Answer: **(d)**

Explanation: Given, A.P. is 3, 8, 13, …, 253

Common difference, d= 5.

In reverse order,

253, 248, 243, …, 13, 8, 5

So,

a = 253

d = 248 − 253 = −5

n = 20

By nth term formula,

a_{20} = a+(20−1)d

a_{20} = 253+(19)(−5)

a_{20} = 253−95

a_{20} = 158

12. The sum of the first five multiples of 3 is:

(a)45

(b)55

(c)65

(d)75

Answer: **(a)**

Explanation: The first five multiples of 3 is 3, 6, 9, 12 and 15

a=3 and d=3

n=5

Sum, $S_n = n/2[2a+(n-1)d]$

$S_5 = 5/2[2(3)+(5-1)3]$

$=5/2[6+12]$

$=5/2[18]$

$=5 \times 9$

$= 45$

13.The midpoints of a line segment joining two points A(2, 4) and B(-2, -4)

(a) (-2,4)

(b) (2,-4)

(c) (0, 0)

(d) (-2,-4)

Answer: c

Explanation: As per midpoint formula, we know;

$x=[2+(-2)]/2 = 0/2 = 0$

$y=[4+(-4)]/2=0/2=0$

Hence, (0,0) is the midpoint of of AB.

14.The distance of point A(2, 4) from x-axis is

(a)2

(b)4

(c)-2

(d)-4

Answer: b

Explanation: Distance of a point from x-axis is equal to the ordinate of the point.

15.If O(p/3, 4) is the midpoint of the line segment joining the points P(-6, 5) and Q(-2, 3). The value of p is:

(a)7/2

(b)-12

(c)4

(d)-4

Answer: b

Explanation: Since, (p/3, 4) is the midpoint of line segment PQ, thus;

p/3 = (-6-2)/2

p/3 = -8/2

p/3 = -4

p= -12

Therefore, the value of p is -12.

16.The points which divides the line segment of points P(-1, 7) and (4, -3) in the ratio of 2:3 is:

(a)(-1, 3)

(b)(-1, -3)

(c)(1, -3)

(d)(1, 3)

Answer: d

Explanation: By section formula we know:

x=[(2.4)+(3.(-1))]/(2+3) = (8-3)/5 = 1

y=[(2.(-3))+(3.7)]/(2+3) = (-6+21)/5 = 3

Hence, the required point is (1,3)

17.The ratio in which the line segment joining the points P(-3, 10) and Q(6, – 8) is divided by O(-1, 6) is:

(a)1:3

(b)3:4

(c)2:7

(d)2:5

Answer: c

Explanation: Let the ratio in which the line segment joining P(-3, 10) and Q(6, -8) is divided by point O(-1, 6) be k :1.

So, -1 = (6k-3)/(k+1)

–k – 1 = 6k -3

7k = 2

k = 2/7

Hence, the required ratio is 2:7.

18.The coordinates of a point P, where PQ is the diameter of circle whose centre is (2, – 3) and Q is (1, 4) is:

(a)(3, -10)

(b)(2, -10)

(c)(-3, 10)

(d)(-2, 10)

Answer: a

Explanation: By midpoint formula, we know;

[(x+1)/2,(y+4)/2] = (2,-3) (Since, O is the midpoint of PQ)
(x+1)/2 = 2

x+1=4

x=3

(y+4)/2 = -3

y+4=-6

y=-10

So, the coordinates of point P is (3, -10).

19..The area of a rhombus if its vertices are (3, 0), (4, 5), (-1, 4) and (-2,-1) taken in order, is:

(a)12 sq.unit

(b)24 sq.unit

(c)30 sq.unit

(d)32 sq.unit

Answer: 24

Explanation: To find the area of the rhombus, we need to find the length of its diagonals and use the below formula:

Area = ½ (Diagonal$_1$)(Diagonal$_2$)

Area = (1/2) (AC)(BD)

Diagonal$_1$=√[(3-(-1))$_2$+(0-4)$_2$]= 4√2

Diagonal$_2$ = √[(4-(-2))$_2$+(5-(-1))$_2$]=6√2

Area = ½ x 4√2 x 6√2 = 24 sq.unit.