Quant Modern Maths Mahayagya

10 Questions
Time: 10 mins

1. $x^2 - 4x + 4 + x^2 - 10 + 25 = 0$, find the value of x?
1) 3 2) 5 3) 1 4) 4 5) 0

2. Find the value of x^2+1/x^2 given that $x=3+\sqrt{8}$?
1) 13 2) 30 3) 40 4) 36 5) 34

3. Find value of $51^2 - 49^2$
1) 150 2) 200 3) 100 4) 250 5) 300

4. Find the sum of the following series
$11^2 + 12^2 + 13^2 + 14^2 + 15^2 + ... + 20^2$
a) 2540 b) 2200 c) 2485 d) 1485 d) 1222

5. Find the 7th term in the series 4,8,16…
a) 512 b)256 c)64 d) 122 e) 1024

6. The sum of the fourth and twelfth term of an arithmetic progression is 20. What is the sum of the first 15 terms of the arithmetic progression?
A. 300 B. 120 C. 150 D. 170 E. 270

7. The angles of triangle are in A.P. The greatest angle is twice the least. Find the largest angle of triangle.
a) 20 b) 40 c) 60 d) 80 e) 100

8. How many 3 digits numbers can be formed form the word MANGO starting with G?
a) 12 b) 20 c) 15 d) 25

9. Bag with 2 Red, 3 Green, 2 Blue balls. Find probability if two balls are picked and both are Non Green ball? a) 2/7 b) 5/7 c) 3/7 d) 4/7

10.Angle of Depression is 30 degrees from the girl on top of 50 ft tower to another girl standing across the road. Find the length of the road?
a) 12 b) 50V3 c) 50 d) 25

Solutions

1. $(x - 2)^2 + (x-5)^2 = 0$. X = 2, 5

Using $(a + b)^2 = a^2 + b^2 + 2ab$

$$\left(x+\frac{1}{x}\right)^2 = x^2+\frac{1}{x^2}+2\times x\times\frac{1}{x}$$

$$\Rightarrow x^2+\frac{1}{x^2} = \left(x+\frac{1}{x}\right)^2-2$$

$$x+\frac{1}{x} = 3+\sqrt{8}+\frac{1}{3+\sqrt{8}}$$

Multiplying and dividing the denominator part by its conjugate $3 - \sqrt{8}$

$$\Rightarrow x+\frac{1}{x} = 3+\sqrt{8}+\frac{3-\sqrt{8}}{(3+\sqrt{8})(3-\sqrt{8})}$$

$$\Rightarrow x+\frac{1}{x} = 3+\sqrt{8}+\frac{3-\sqrt{8}}{9-8}$$

$$\Rightarrow x+\frac{1}{x} = 3+\sqrt{8}+3-\sqrt{8}=6$$

$$x^2+\frac{1}{x^2} = \left(x+\frac{1}{x}\right)^2-2$$

$$= 6^2-2$$

2. $= 34$
3. $51^2 – 49^2 = (51 + 49)(51 - 49) = (100)(2) = 200$
4. $S20 – S10 = n(n+1)(2n+1)/6 = 2870 – 385 = 2485$
5. n th term of a geometric progression can be found by using the formula Tn = arn-1. In the given series a = 4, r = 2 and n = 2. Hence T7 = 4 X 26 = 256
6. $a_4 + a_{12} = 20$

$$a + 3d + a + 11d = 20$$

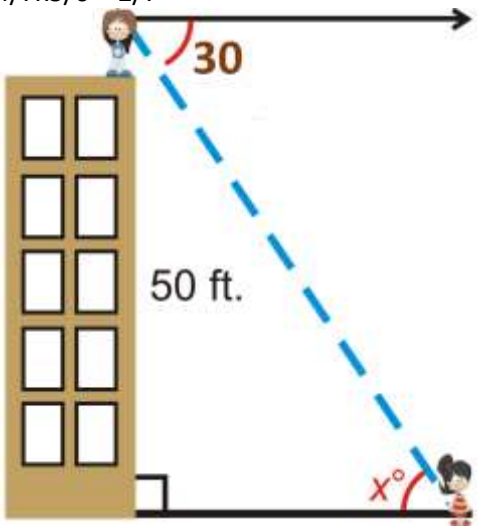
$$2a + 14d = 20$$

$$S_{15} = \frac{15}{2}(2a + 14d) = \frac{15 \times 20}{2} = 150$$

Solution
Let a - d, a, a + d be the three angles of the triangle that form AP.
Given that the greatest angle is twice the least.

Now, 2(a - d) = a + d
2a - 2d = a + d
a = 3d ----------(1)
Now by angle sum property,
(a - d) + a + (a + d) = 180°
3a = 180°
a = 60°----------(2)

from (1) and (2),
3d = 60°
d = 20°

Now, the angles are,
a - d = 60° - 20° = 40°
a = 60°
a + d = 60° + 20° = 80°.

7.
8. M _ _ = 1 x 4 x 3 = 12 ways
9. 4/7x3/6 = 2/7
10.