

**CLASS: X****SUBJECT: MATHEMATICS****TOPIC: QUADRATIC EQUATIONS**

1) Solve for x:

a)  $9x^2 - 9(a+b)x + 2a^2 + 5ab + 2b^2 = 0$

$(2a+b/3, a+2b/3)$

b)  $4x^2 - 4a^2x + (a^4 - b^4) = 0$

$(a^2+b^2)/2, (a^2-b^2)/2$

c)  $10ax^2 - 6x + 15ax - 9 = 0$

$(-3/2, 3/5a)$

d)  $x^2 - 2(a^2 + b^2)x + (a^2 - b^2)^2 = 0$

$(a+b)^2, (a-b)^2$

e)  $\sqrt{7}x^2 - 6x - 13\sqrt{7} = 0$

$(13\sqrt{7}/7, -\sqrt{7})$

f)  $10x^2 + 3bx + a^2 - 7ax - b^2$

2) find the value of k so that the quadratic equation has equal roots:

a)  $2kx^2 - 40x + 25 = 0$

$(k = 8)$

b)  $2x^2 - (k-2)x + 1 = 0$

$(2 \pm 2\sqrt{2})$

c)  $(k+3)x^2 + 2(k+3)x + 4 = 0$

$(1, -3)$

3) For what value of p the equation  $(1+p)x^2 + 2(1+2p)x + (1+p) = 0$  has coincident roots

$(0, -2/3)$

4) Find the roots of the following quadratic equation by the method of completing the Square.

a)  $a^2x^2 - 3abx + 2b^2 = 0$

$(2b/a, b/a)$

b)  $x^2 - 4ax + 4a^2 - b^2 = 0$

c)  $6x^2 - 7x + 2 = 0$

$(2/3, 1/2)$

d)  $4x^2 + 4\sqrt{3}x + 3 = 0$

$(\pm \sqrt{3}/2)$

5) Solve the following quadratic equations by factorization method:

a)  $3x^2 - 2\sqrt{6}x + 2 = 0$

$(\sqrt{2}/3, \sqrt{2}/3)$

b)  $x^2 - 5\sqrt{5}x + 30 = 0$

$(3\sqrt{5}, 2\sqrt{5})$

c)  $ax^2 + a = a^2x + x$

$(a, 1/a)$

6) write the nature of roots of quadratic equation: a)  $4x^2 + 4\sqrt{3}x + 3 = 0$  b)  $x^2 - b^2 - a(2x - a) = 0$ 7) Check whether the equation  $x^3 - 4x^2 + 1 = (x-2)^2$  is quadratic or not8) Solve for x:  $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}, a+b \neq 0$ 

$(-a, -b)$

9) If p, q are the roots of the equation  $x^2 - 5x + 4 = 0$ , find the value of  $\frac{1}{p} + \frac{1}{q} - 2pq$ 

$(-27/4)$

10) Solve for x:  $\frac{x}{x+1} + \frac{x+1}{x} = \frac{34}{15}$ 

$(3/2, -5/2)$

11) Solve for x:  $\frac{1}{x-3} - \frac{1}{x+5} = \frac{1}{6}$ 

$(7, -9)$

12) If one root of a quadratic equation  $3x^2 + Px + 4 = 0$  is  $2/3$ , find the value of p

$(p = -8)$

13) If  $x = \sqrt{2}$  is a solution of quadratic equation  $x^2 + kx - 4 = 0$ , then find the value of k

$(k = \sqrt{2})$

14) Solve for x:  $2\left[\frac{2x-1}{x+3}\right] - 3\left[\frac{x+3}{2x-1}\right] = 5$ 

$(-10, -1/5)$

15) Solve the equation:  $2(x-3)^2 + 3(x-2)(2x-3) = 8(x+4)(x-4) - 1$ 

$(x=5)$

16) If the roots of the equation  $(b-c)x^2 + (c-a)x + (a-b) = 0$  are equal, then prove that  $2b = a + c$ 

17) The sum of the squares of two consecutive odd numbers is 394. Find the numbers.

$(13, 15)$

18) Find two consecutive numbers, whose squares have the sum 85.

$(6, 7)$

19) The product of 3 consecutive even numbers is equal to 20 times their sum. Find the numbers

$(6, 8, \text{ and } 10)$

20) The sum of the areas of two squares is  $640 \text{ m}^2$ . If the difference in their perimeter is 64m. Find the sides of the two squares

$(8\text{m}, 24\text{m})$

21) The difference of two numbers is 4. If the difference of their reciprocals is  $4/21$ , find the numbers

$(3, 7)$

22) The sum of two numbers is 15 and sum of their reciprocals is  $3/10$ . Find the numbers

$(5, 10)$

- 23) The hypotenuse of a grassy land in the shape of a right triangle is 1m more than twice the shortest side. If the third side is 7m More than the shortest side find the sides of grassy land (8, 15)
- 24) The perimeter of a right angled triangle is 70units and its hypotenuse is 29 units. Find the lengths of the other sides (20, 21)
- 25) The length of the sides forming a right angled  $\Delta$  is  $5x$  cm and  $(3x - 1)$  cm. Area of the triangle is  $60 \text{ cm}^2$ . Find the hypotenuse (17cm)
- 26) The length of the hypotenuse of a right angled triangle exceeds the base by 1cm and also exceeds twice the length of the altitude by 3cm. Find the length of each side of  $\Delta$  (base = 12cm, hyp = 13cm, altitude = 5cm)
- 27) A natural number, when increased by 12, becomes equal to 160 times its reciprocal. Find the number (8)
- 28) A takes 6 days less than the time taken by B to finish a piece of work. If both A and B together Can finish it in 4 days; find the time taken by B to finish the work (12 days)
- 29) A two digit number is such that the product of its digits is 18. When 63 is subtracted from the number, the digits interchange their places. Find the number (92)
- 30) A two – digit number is such that the product of its digits is 14. When 45 is added to the number, the digits interchange their Places. Find the number (27)
- 31) Two train leave a railway station at the same time. The first train travels due west and the second train due north. The first train travels 5km/hr faster than the second train. If after two hours, they are 50km apart, find the average speed of each train (20km/hr, 15km/hr)
- 32) The speed of a boat in still water is 15 km/hr. It can go 30km upstream and return downstream to the original point in 4hrs 30min. Find out the speed of the stream (5km/hr)
- 33) A train travels 180km at a uniform speed. If the speed had been 9 km/ hr more, it would have taken 1 hour less for the same Journey. Find the speed of the train. (36km/hr)
- 34) A journey of 192km from station A to station B takes 2hours less by a superfast train than by an ordinary train If the average Speed of the slower train is 16km/hr than that of the faster train, determine their average speed (32 km/hr)
- 35) A plane left 30 minutes late than its scheduled time and in order to reach the destination 1500km away in time it had to Increase the speed by 250 km/h from the usual speed. Find its usual speed (750 km / hr)
- 36) The product of Bilals age five years ago and eight years later is 198. Find his present age (14years)
- 37) The age of father is equal to the square of the age of his son. The sum of the age of father and five times the age of the son Is 66 years. Find their ages (36y, 6y)
- 38) The sum of the reciprocals of rehman's age 3years ago and 5years from now is  $\frac{1}{3}$ , find his present age (7years)
- 39) Is the following situation possible? If so, determine their present ages. The sum of the ages of two friends is 20years. Four years ago, the product of their ages was 48. (D = - 48, No)
- 40) Two water taps together can fill a tank in 6 hrs. The tap of larger diameter takes 9 hrs less than the smaller one to fill the Tank separately. Find the time in which each tap can separately fill the tank (18hrs, 9 hrs)
- 41) Two pipes running together can fill a tank in  $3\frac{1}{13}$  minutes. If one pipe takes 3 minutes more than the other to fill the tank Separately, find the time in which each pipe would fill the tank separately (5 hrs)
- 42) Rs 1200 were distributed equally among certain number of students. Had there been 8 more students, each would have Received Rs 5 less. Find the number of students. (40)
- 43) By increasing the list price of a book by Rs 10 a person can buy 10 less books for Rs 1200. Find the original list price of the book ( Rs 30 )
- 44) One – fourth of a herd of camels was seen in the forest. Twice the square root of the herd gone to mountains and the Remaining 15 camels were seen on the bank of a river. Find the total number of camels (36)
- 45) A peacock is sitting on the top of a pillar, which is 9m high. From a point 27m away from the bottom of the pillar, a snake is Coming to its hole at the base of the pillar .Seeing the snake the peacock pounces on it. If their speeds are equal, at what Distance from the hole is the snake caught? (12m)
- 46) If  $\frac{1}{2}$  is the root of the equation  $x^2 + kx - \frac{5}{4} = 0$  then the value of k is  
a) 2                      b) - 2                      c)  $\frac{1}{4}$                       d)  $\frac{1}{2}$
- 47) Value of k for which the quadratic equation  $2x^2 - kx + k = 0$  has equal roots  
a) 0                      b) 4                      c) 8                      d) 0, 8

48) If the discriminant of the equation  $6x^2 - bx + 2 = 0$  is 1, then the value of b is

- a) 7              b) -7              c)  $\pm 7$               d)  $\pm\sqrt{7}$

49) One root of the quadratic equation  $2x^2 - x + 1/8 = 0$ , is  $1/4$ . The other root is

- a) 0              b)  $1/4$               c)  $1/8$               d)  $-1/4$

50) The roots of the equation  $x^2 - 3x - m(m+3) = 0$ , where m is a constant, are

- a) m, m+3    b) -m, m+3    c) m, -(m+3)    d) -m, -(m+3)

51) The quadratic equation  $ax^2 + bx + c = 0$  has equal roots if

- a)  $b^2 = 4ac$     b)  $b^2 < 4ac$     c)  $b^2 > 4ac$     d)  $b^2 = ac$

**CLASS: X**  
**TOPIC: ARITHMETIC PROGRESSIONS**

**SUBJECT: MATHEMATICS**

- 1) For what value of  $p$ , are  $2p-1$ ,  $7$  and  $3p$  three consecutive terms of an A.P? (P=3)
- 2) Find the value of  $k$ , so that  $3k + 7$ ,  $2k + 5$ ,  $2k + 7$  are in A.P (k= -4)
- 3) If  $\frac{1}{x+2}$ ,  $\frac{1}{x+3}$  and  $\frac{1}{x+5}$  are in A.P, find the value of  $x$  (1, -3)
- 4) How many two digit numbers are divisible by 7 (n = 13)
- 5) Find the number of integers between 50 and 500 which are divisible by 7 (64)
- 6) Find the 15<sup>th</sup> term from the end of the A.P: 3, 5, 7,....., 201 (173)
- 7) Find the 11<sup>th</sup> term from the end of the A.P: 10, 7, 4,....., - 62 (-32)
- 8) Find the middle term of A.P: 1, 8, 15, ....., 505 (253)
- 9) In an A.P. the first term is 8 and the common difference is 7. If the last term of the A.P is 218, find its middle term (113)
- 10) Which term of the sequence 114, 109, 104... is the first negative term? (24)
- 11) Which term of the sequence 121, 117, 113... is the first negative term? (32)
- 12) If the  $n^{\text{th}}$  term of the A.P. 9, 7, 5, ..... is the same as the  $n^{\text{th}}$  term of the A.P. 15, 12, 9, ....., find  $n$  (n = 7)
- 13) If the 3<sup>rd</sup> and 9<sup>th</sup> term of an A.P. are 4 and -8 respectively, which term is zero (n = 5)
- 14) Determine the A.P whose 3<sup>rd</sup> term is 16 and 7<sup>th</sup> term exceeds the 5<sup>th</sup> term by 12 (4, , 10, 16 ...)
- 15) The 4<sup>th</sup> term of an A.P is equal to 3 times the first term and the 7<sup>th</sup> term exceeds twice the 3<sup>rd</sup> term by 1. Find the A.P (3, 5, 7, ...)
- 16) The sum of 4th and 8th terms of an A.P is 24 and sum of 6<sup>th</sup> and 10<sup>th</sup> term is 44. Find A.P. (-13, -8, -3 .....,)
- 17) Find the A.P whose  $n^{\text{th}}$  term is  $10 - 3n$  (7, 4, 1, .....,)
- 18) Determine the 2<sup>nd</sup> term and  $n^{\text{th}}$  term of an A.P whose 6<sup>th</sup> term is 12 and 8<sup>th</sup> term is 22 (- 8, - 18 + 5n)
- 19) If 6 times the sixth term of an A.P is equal to 15 times the fifteenth term, find its 21<sup>st</sup> term (0)
- 20) Which term of the A.P.? 3, 15, 27, 39, will be 120 more than its 21<sup>st</sup> term (n = 31)
- 21) Show that progression 7, 2, -3, -8,..... Is an A.P. Find its  $n^{\text{th}}$  term (12 - 5n)
- 22) Verify that  $a + b$ ,  $(a + 1) + b$ ,  $(a + 1) + (b + 1)$  ..... Is an A.P. and then write its next term (a+2) + (b+1)
- 23) In the following A.P. find the missing term: \*, 38, \*, \*, \*, -22
- 24) For A.P.  $a_1, a_2, a_3 \dots$  if  $a_4/a_7 = 2/3$ , find  $a_6/a_8$
- 25) The angles of a triangle are in A.P, the last being half the greatest. Find the angles. (40°, 60°, 80°)
- 26) The sum of 3 numbers in A.P is 3 and their product is -35. Find the numbers (7, 1, and -5)
- 27) If the 4<sup>th</sup> term of an A.P is twice the 8<sup>th</sup> term, prove that the 10<sup>th</sup> term is twice the 11<sup>th</sup> term
- 28) Find  $a_{30} - a_{20}$  for the A.P : -9, -14, -19, -24, ..... (- 50)
- 29) If the  $n^{\text{th}}$  term of an A.P is  $(5n - 2)$ , find its first term and common difference
- 30) In an A.P, if the 6<sup>th</sup> and 13<sup>th</sup> terms are 35 and 70 respectively, find the sum of its first 20 terms.
- 31) In an A.P., if the sum of its 4<sup>th</sup> and 10<sup>th</sup> terms is 40, and sum of its 8<sup>th</sup> and 16<sup>th</sup> terms is 70, then find the sum of its First 20 terms (S<sub>20</sub> = 610)
- 32) In an A.P., the first term is 25, nth term is -17 and sum to first n terms is 60. Find n and d the common difference.
- 33) If  $S_n$ , the sum of first n terms of an A.P is given by  $S_n = 3n^2 - 4n$ , then find its nth term (6n - 7)
- 34) The sum of n terms of an A.P. is  $3n^2 + 5n$ . Find the A.P. Hence, find its 16<sup>th</sup> term (6n + 2, 98)
- 35) Find the sum of n terms of an A.P whose  $n^{\text{th}}$  term is given by  $t_n = 5 - 6n$  (2n - 3n<sup>2</sup>)
- 36) Find the sum of all natural numbers less than 100 which are divisible by 6 (816)
- 37) Find the sum of 3 digit numbers which are not divisible by 7 (424214)
- 38) Find the sum of all the natural numbers upto 100, which are not divisible by 5 (4000)
- 39) Find the sum of all three digit numbers which leave the remainder 3 when divided by 5 (99090)
- 40) Find the sum of first seven multiples of 5 (140)
- 41) Find the sum of all natural numbers up to 100, which are not divisible by 5 (4000)

- 42) If  $2 + 5 + 8 + \dots + x = 155$ , find  $x$  ( $n = 10, x = a_{10} = 29$ )
- 43) Find the sum of the following A.P:  $1 + 3 + 5 + \dots + 199$ . (10000)
- 44) Find the common difference of an AP whose first term is 100 and sum of first six terms is 5 times the the sum of the next 6 terms ( $d = -10$ )
- 45) Find the number of terms of the A.P, 63, 60, 57, ..... So that their sum is 693 ( $n = 22, 21$ )
- 46) How many terms of the sequence 18, 16, 14, ....., should be taken so that their sum is 0 ( $n = 19$ )
- 47) A sum of Rs 1400 is to be used to give 7 cash prizes to students of a school for their overall academic Performance if each prize is Rs40 less than the preceding price, find the value of each of the prizes. (320, 280, 240, 200, 160, 120, 80)
- 48) Find the sum of first 22 terms of an A.P. in which  $d = 7$  and  $22^{\text{nd}}$  term is 149 (1661)
- 49) Find the sum of the following A.P:  $3, 9/2, 6, 15/2, \dots$  To 25 terms (525)
- 50) The ratio of the sum to  $p$  terms and  $q$  terms of an A.P. is  $p^2 : q^2$ . Prove that the common difference of the A.P. is twice the first term
- 51) An auditorium has 50 rows with 20 seats in the first row, 22 in the second, 24 in the third and so fourth. How many seats are in the auditorium? (3450)
- 52) The sum of the first five terms of an A.P is 25 and the sum of its next five terms is  $-75$ . Find the  $10^{\text{th}}$  term of the A .P
- 53) In an A.P the sum of first  $n$  terms  $\frac{3n^2}{2} + \frac{5n}{2}$  . Find its  $25^{\text{th}}$  term. (76)
- 54) The sum of first five multiples of 3 is  
a) 45      b) 65      c) 75      d) 90
- 55) First term of an A.P is  $-3$  and common difference is  $-2$ , then fourth term is  
a) 3      b)  $-3$       c) 4      d)  $-9$
- 56) If the  $p^{\text{th}}$  term of an A.P is  $q$  and  $q^{\text{th}}$  term of A.P is  $p$ , then its  $(p + q)^{\text{th}}$  term is  
a) 0      b)  $p + q$       c)  $p - q$       d)  $pq$
- 57) The sum of first 11 terms of an A.P whose middle term is 30, is  
a) 320      b) 330      c) 340      d) none of these
- 58) In an A.P, if  $d = -2$ ,  $n = 5$  and  $a_n = 0$ , then the value of  $a$  is  
a) 10      b) 5      c)  $-8$       d) 8
- 59) If the common difference of an A.P is 3, then  $a_{20} - a_{15}$  is  
a) 5      b) 3      c) 15      d) 20
- 60) The common difference of an A.P having its  $n^{\text{th}}$  term  $(3n + 5)$  is  
a) 3      b) 5      c) 7      d) none of these
- 61) The next term of the A.P.  $\sqrt{18}, \sqrt{50}, \sqrt{98}, \dots$ , is  
a)  $\sqrt{146}$       b)  $\sqrt{128}$       c) 162      d)  $\sqrt{200}$
- 62) The sum of all natural numbers from 1 to 100 is  
a) 4050      b) 5050      c) 6050      d) 7050
63. The  $30^{\text{th}}$  term of the A.P : 10, 7, 4, ..... is  
a) 97      b) 77      c) 67      d) 87
64. Which term of the A.P 17, 34, 51, ..... is 171  
a) 10      b) 11      c) 9      d) term does not belong to A.P
65. 5 times  $5^{\text{th}}$  term of A .P is equal to 8 times  $8^{\text{th}}$  term the A.P then its  $13^{\text{th}}$  term is  
a) 5      b) 8      c) 12      d) 0
66. The value of  $a_{30} - a_{20}$  for the A.P. 2, 7, 12, 17, ..... is  
a) 100      b) 10      c) 50      d) 20