QUADRATIC EQUATION PYQ

1. Which one of the following equations does ***not*** have real roots ?
   (A) $x^2 - 2x - 2\sqrt{3} = 0$ (B) $x^2 - 4x + 4\sqrt{2} = 0$ (C) $3x^2 + 4\sqrt{3}x + 3 = 0$ (D) $x^2 - 4x - 2\sqrt{2} = 0$

2. Two numbers are in the ratio 5 : 6. If 8 is subtracted from each of the numbers, the ratio becomes 4 : 5. Find the numbers.

3. The equation $3x^2 + 12 = 0$ has :
   (A) real and distinct roots
   (B) no real roots
   (C) real and equal roots
   (D) roots which are reciprocal of each other

4. If one root of the quadratic equation $x^2 - 4x + 3 = 0$ is 1, then the other root is :
   (A) 4 (B) – 4
   (C) 3 (D) – 3

5. Check whether the following equation is quadratic or not. If yes, find its roots.
   $(x^3 - 4x^2 + 3x + 1) = (x - 2)^3$

6. A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Find the reduced speed of the train. Also, find the original speed.

7. Ashok and Harish are very close friends. They decided to go on a long drive with their families in separate cars. Ashok's car travels at a speed of x km/h, while Harish was driving the car at a speed of 5 km/h faster than Ashok's car. Ashok took 4 hours more than Harish to complete the journey of 400 km.
   Based on the above information, answer the following questions :
   (i) Find the distance covered by Harish's car in two hours (in terms of x).
   (ii) Make a quadratic equation describing the speed of Ashok's car.
   (iii) (a) Find the speed of Ashok's car (in km/h).
   OR
   (b) Find the speed of Harish's car (in km/h)

8. The equation $x^2 + x + 1 = 0$ has :
   (A) real and distinct roots (B) no real roots (C) real and equal roots
   (D) both negative roots

8. The difference of squares of two positive integers is 400. Find the integers if twice of the smaller integer is 5 more than the greater integer.

10. Solve for x:
    $\frac{3}{x+1} - \frac{2}{3x-1} = \frac{1}{2}$ $(x \neq -1, 1/3)$

11. The difference of squares of two positive integers is 400. Find the integers if twice of the smaller integer is 5 more than the greater integer. (errors. eraser)

12. Find two consecutive even positive integers, sum of whose squares is 884.

OR

Solve for x:

$$\frac{1500}{x} - \frac{1}{2} = \frac{1500}{x+250}$$

13. The equation $4x^2 - 25 = 0$ has :

(A) no real roots (B) real and equal roots

(C) real and distinct roots (D) real roots of same sign

14. The discriminant of the quadratic equation $8x^2 + 2x - 3 = 0$, is :

(errors. eraser)

15. The speed of a motor boat in still water is 25 km/h. For covering a distance of 40 km, the boat took 40 minutes more to go upstream than downstream.

Based on the above, answer the following questions :

(i) Let the speed of the stream be x km/h. Express, in terms of x, the speed of the motor boat going upstream.

(ii) Express the above situation in terms of a quadratic equation in x.

(iii) (a) Find the speed of the stream.

(b)I f the speed of the stream is 10 km/h, how much time will the boat take to cover 40 km upstream ?

(errors. eraser)

15. If the roots of the quadratic equation $4x^2-5x+k=0$ are real and equal then value of K is :

17. A cottage industry produces a certain number of toys in a day.The cost of Production of each toy(inrupees) was found to be 55 minus the number of Toys produced in a day.On a particular day, the total cost of production was` 750.Find the total number of toys produced on that day. (errors. eraser)

18. Which of the following equations has 2 as a root ?

(A) $x^2 - 4x + 5 = 0$ (B) $x^2 + 3x - 12 = 0$

(C) $2x^2 - 7x + 6 = 0$ (D) $3x^2 - 6x - 2 = 0$

19. Which of the following quadratic equations has –1 as a root ?

(A) $x^2 - 4x - 5 = 0$ (B) $-x^2 - 4x + 5 = 0$

(C) $x^2 + 3x + 4 = 0$ (D) $x^2 - 5x + 6 = 0$

20. A cottage industry produces a certain number of pottery articles in a day. It was observed that on a particular day that the cost of production of each article (in rupees) was 3 more than twice the number of articles Produced on that day. If the total cost of production on that day was` 90, Find the number of articles produced and the cost of each article. (errors. eraser)

21. The value(s) of k for which the quadratic equation $5x^2 - 9kx + 5 = 0$ has real and equal roots, is/are:

22. The roots of the quadratic equation $x^2 - 4 = 0$ is/are :

23. Which of the following is not a quadratic equation ?
(A) $(x - 2)^2 + 1 = 2x - 3$
(B) $(2x - 1)(x - 3) = (x + 5)(x - 1)$
(C) $x(x + 1) + 8 = (x + 2)(x - 2)$
(D) $2x + 3/x = 5$

24. Using quadratic formula, find the real roots of the equation $2x^2 + 2x + 9 = 0$, if they exist.

25. Find the values of 'k' for which the quadratic equation $kx^2 - 2kx + 6 = 0$ has real and equal roots. Also, find the roots.

26. The roots of the quadratic equation $x^2 + 3x - 10 = 0$ are

27. The discriminant of the quadratic equation $x^2 - 4x + 3 = 0$ is:

28. If 2/3 is a root of the quadratic equation $kx^2 - x - 2 = 0$, then find the value of k.

29. The roots of the quadratic equation $ax^2 + bx + c = 0$ are real and distinct, if :
A) $b^2 - 4ac > 0$ B) $b^2 - 4ac = 0$ C) $b^2 - 4ac < 0$ D) $b^2 - 4ac \geq 0$

30. The roots of the quadratic equation $x^2 + px-q = 0$ are equal, if
a) $p^2 = 4q$ (b) $p^2 = -4q$ (c) $p^2 = 2q$ (d) $p^2 = -2q$

31. The sum of the ages of father and his son is 45 years . 5 years ago the products of their ages was 124. Find the present ages .

32. The diagonal of a rectangular field is 60 metres more than the shorter side. If the longer side is 80 metres more than the shorter side, find the sides of the field.

33. The sum of the reciprocals of Rehmans ages, (in years) 3 years ago and 5 years from now is 1/3. Find his present age.

34. A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.

35. A quadratic equation whose one root is 2 and the sum of whose roots is zero, is :
(a) $x^2 + 4 = 0$ (b) $x^2 - 2 = 0$ (c) $4x^2 - 1 = 0$ (d) $x^2 - 4 = 0$

36. Which of the following is not a quadratic equation ?
(a) $2(x-1)^2 = 4x^2 - 2x + 1$
(b) $2x - x^2 = x^2 + 5$
(c) $(\sqrt{2}x + \sqrt{3})^2 + x^2 = 3x^2 - 5x$
(d) $(x^2+2x)^2 = x^4 + 3 + 4x^3$

37. The difference of two numbers is 5 and the difference of their reciprocals is 1/10. Find

the numbers.

38. Find all the values of k for which the quadratic equation $2x^2 + kx + 8 = 0$ has equal roots . Also, find the roots.

39. The length of the rectangle exceeds its breadth by 8 cm and the area of the rectangle is 240 cm^2. Find the dimensions of the rectangle.

(error · eraser)

40. A 2-digit number is four times the sum of its digits and twice the product of its digits. Find the number.

41. Divide 16 into two parts such that twice the square of the greater part, exceeds the square of the smaller part by 164.

(error · eraser)

42. A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream, than to return to the same point. Find the speed of the stream and total time of the journey.

43. If one root of the quadratic equation $3x^2-8x-(2k+1)=0$ is seven times the other, then find the value of k.

44. Write a quadratic equation with roots -3 and 5.

45. The sum of ages of a boy and his sister is 25 (in year)and product of their ages is 150 .Find their present ages.

(errors · eraser)

46. For what value of p, does the quadratic equation $px^2+2x+p=0$ have real and equal roots?

47. The sum of the two number is 45. If 5 is subtracted from each of them , the product of these numbers becomes 124. Find the numbers.

(errors · eraser)

48. If $x = 3$ is one root of the quadratic equation $2x^2 + px + 30 = 0$, find the value of p and also root of the equation.

49. The length of a rectangular park is 5m more than twice it's breadth. If the area of the park is $250m^2$, find the length and breadth of the park?

(errors · eraser)

50. The altitude of a right triangle is 7 cm less than its base. If the length of the hypotenuse is 13 cm, then find the length of the other two sides.

51. Find the value of m for which the quadratic equation $(m-1)x^2 + 2(m-1)x + 1 = 0$ has two real and equal roots.

(errors · eraser)

52. Solve the following quadratic equation for x : $\sqrt{3}x^2 + 10x + 7\sqrt{3} = 0$

53. The product of Rehan's age (in years) 5 years ago and his age 7 years from now, is one more than twice his present age. Find his present age.

54. The sum of two numbers is 34 . If 3 is subtracted from one number and 2 is added to another, the prodcut of these two numbers becomes 260 . Find the numbers.

55. The hypotenuse (in cm) of a right angled triangle is 6 cm more than twice the length of the shortest side. If the length of third side is 6 cm less than thrice the length of shortest side, then find the dimensions of the triangle. (errors · eraser)

56. Solve the quadratic equation for x : $x^2-2ax-(4b^2- a^2) = 0$

57. If the quadratic equation $(1 + a^2) x^2 + 2abx + (b^2-c^2) = 0$ has equal and real roots, then prove that : $b^2 = c^2 (1 + a^2)$

58. For what value of m, the quadratic equation : $mx^2-2 (m-1) x + (m + 2) = 0$ has two real and equal roots ? (errors · eraser)

59. The diagonal of a rectangular field is 60 metres more than the shorter side. If the longer side is 30 metres more than the shorter side, find the sides of the field. (errors · eraser)

60. If the sum of the roots of the quadratic equation $ky^2-11y+(k-23) = 0$ is 13/21 more than the product of the roots, then find the value of k.

61. If x = -2 is the common solution of quadratic equations $ax^2+x-3a = 0$ and $x^2+bx+b=0$ then find the value of a^2b.

62. Find the value of 'p' for which the quadratic equation $p(x-4)(x-2)+(x-1)^2 = 0$ has real and equal roots. (errors · eraser)

63. Had Aarush scored 8 more marks in a Mathematics test, out of 35 marks, 7 times these marks would have been 4 less than square of his actual marks. How many marks did he get in the test ?

64. The product of two consecutive odd positive integers is 255. Find the integers, by formulating a quadratic equation. (errors · eraser)

65. Find the value(s) of k for the quadratic equation, $(k + 3) x^2 + kx + 1 = 0$, to have two real and equal roots.

66. The least positive value of k , for which the quadratic equation $2x^2 +kx-4 =0$ has rational roots, is
(A) $\pm 2\sqrt{2}$ (B) 2 (C) ± 2 (D) $\sqrt{2}$

67. Which of the following quadratic equations has sum of its roots as 4 ?
(a) $2x^2 -4x + 8 = 0$ (b) $x^2 + 4x + 4 = 0$ (c) $\sqrt{2}x^2 -(4/\sqrt{2})x + 1 = 0$ (d) $4x^2-4x + 4 = 0$ (errors · eraser)

68. Find the value of 'p' for which the quadratic equation $px(x - 2) + 6 = 0$ has two equal real roots.

69. A quadratic equation whose roots are $(2 + \sqrt{3})$ and $(2-\sqrt{3})$ is :
(a) $x^2-4x + 1 = 0$ (b) $x^2 + 4x + 1 = 0$ (c) $4x^2 -3 = 0$ (d) $x^2 -1 = 0$

70. A train travels at a certain average speed for a distance of 54 km and then travels a distance of 63 km at an average speed of 6 km/h more than the first speed. If it takes 3 hours to complete the journey, what was its first average speed ?

71. Two pipes together can fill a tank in 15/8 hours. The pipe with larger diameter takes 2 hours less than the pipe with smaller diameter to fill the tank separately. Find the time in which each pipe can fill the tank separately.

72. If one root of the equation $2x^2-5x + (a-4) = 0$ be the reciprocal of the other, then the value of 'a' is

73. The roots of the quadratic equation $x^2 + x - p(p + 1) = 0$ are

74. In a flight of 2800 km, an aircraft was slowed down due to bad weather. Its average speed is reduced by 100km/h and by doing so, the time of flight is increased by 30 minutes. Find the original duration of the flight.

75. The denominator of a fraction is one more than twice the numerator. If the sum Of the fraction and its reciprocal is $2\frac{16}{21}$, find the fraction.

76. Find the value of 'c' for which the quadratic equation
$(c + 1)x^2 - 6(c + 1)x + 3(c + 9) = 0$; $c \neq -1$ has real and equal roots.

77. A train travels a distance of 90 km at a constant speed. Had the speed been 15 km/h more, it would have taken 30 minutes less for the journey. Find the original speed of the train.

78. The age of a man is twice the square of the age of his son. Eight years hence, the age of the man will be 4 years more than three times the age of his son. Find their present Ages.

79. Some students planned a picnic. The total budget for food was 500, but 5 of them failed to go and thus the cost of food for each student increased by 5. How many students attended the picnic ?

80. Find the value of p if the equation
$(2p + 1)x^2 - (7p + 2)x + 7p - 3 = 0$ has real and equal roots

81. If Nidhi were 7 years younger than what she actually is, then the square of her age (in years) would be 1 more than 5 times her actual age. What is her present age ?

82. A shopkeeper buys a number of books for ₹ 1,800. If he had bought 15 more books for the same amount, then each book would have cost him ₹ 20 less. Find how many books he bought initially.

83. To keep the lawn green and cool, Sadhna uses water sprinklers which rotate in circular shape and cover a particular area. The diagram below shows the circular areas covered by two sprinklers : (R>r) Two circles touch externally. The sum of their areas is 130π sqm and the distance between their centres is 14 m .

Based on above information, answer the following questions :

(i) Obtain a quadratic equation involving R and r from above.
(ii) Write a quadratic equation involving only r .
(iii) Find the radius r and the corresponding area irrigated.

84. The altitude of a right-angled triangle is 7 cm less than its base. If its hypotenuse is 17 cm long, then

(a) represent the above information in the form of a quadratic equation;
(b) find the length of the sides of the triangle.

85. The length of a rectangular field is 30 m more than its breadth and the diagonal is 60 m more than its breadth. Find the dimensions of the field.