MATHS

BOOKS - NAVBODH MATHS (HINGLISH)

QUADRATIC EQUATIONS

2 1 1 Mark Each

1. Which of the following is a quadratic eqaution ?

A. $6x^2 = 2 - x^3$

B. $x^2\left(\frac{1}{x} - 2\right) = \frac{7}{2}$

C. $\frac{3}{x} - 3 = 4x^2$

D. $5x + 7 = 3x$

Answer: B

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2. What is the value of k, if $\frac{1}{2}$ is a root of the equation $x^2 + kx - \frac{5}{4} = 0$?

A. $\frac{1}{2}$

B. -2

C. 2

D. $\frac{1}{4}$

Answer: C [Substitute $\frac{1}{2}$ for x .]

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3. What is the value of k, if the roots of $x^2 + kx + k = 0$ are real and equal ?

A. 0

B. 4

C. 0 or 4

D. 2

Answer: C [The roots are real and equal $\therefore \Delta = 0$**]**

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4. For which of the following equations is $\alpha + \beta = 11$ and $\alpha\beta = 33$?

A. $x^2 - 11x + 33 = 0$

B. $x^2 - 11x - 33 = 0$

C. $x^2 + 11x + 33 = 0$

D. $x^2 + 11x - 33 = 0$

Answer: A

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5. What are the roots of the quadratic equation $2x^2 - 7x + 6 = 0$?

A. $2, -\frac{3}{2}$

B. $2, \frac{3}{2}$

C. $2, \frac{2}{3}$

D. $-2, \frac{3}{2}$

Answer: B $[(x-2)(2x-3)=0]$

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6. What is the naure of the roots of the quadatic equation $2x^2 - 3x - 4 = 0$?

A. Real

B. Real and equal

C. Real and unequal

D. Not real

Answer: C $[\Delta > 0]$

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7. For the quadratic equation $x^2 + 10x - 7 = 0$, the values of a,b,c are

A. $a = -1, b = 10, c = 7$

B. $a = 1, b = -10, c = 7$

C. $a = 1, b = 10, c = -7$

D. $a = 1, b = 10, c = 7$

Answer: C

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8. Which of the following is the value of the discriminant for $\sqrt{2}x^2 - 5x + \sqrt{2} = 0$

A. -5

B. 17

C. $\sqrt{2}$

D. $2\sqrt{2}-5$

Answer: B $[\Delta = b^2 - 4ac]$

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2 2 1 Mark Each

1. Write the following quadratic equations in standard form and write the values of a,b,c.

(i) $x^2 - 3 = x$ (ii) $y^2 = 4$

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2. Write the roots of the following quadratic equations :

(i) $x^2 + x - 60$ (ii) $(x + 6)(x - 3) = 0$

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3. Write the quadratic equations, if

(i) $\alpha + \beta = -6, \alpha\beta = 4$ (ii)

$\alpha + \beta = 8, \alpha\beta = -3$

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4. Write the values of $\alpha + \beta$ and $\alpha\beta$ for the following quadratic equations :

(i) $4x^2 - 5x - 3 = 0$ (ii) $x^2 + 9x - 10 = 0$

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5. For solving quadratic equation $x^2 + 8x = -15$ by completing square method, find the third term.

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6. If a=2,b= -11 , c = 15 , find the value of $b^2 - 4ac$.

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2 3 2 Marks Each

1. Write the equation $(x-1)^2 = 2x+3$ in standard form and write the values of a,b and c.

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2. Find the value of the discriminant (Δ) for the quadratic equation $x^2 + \ + 7x + 6 = 0$

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3. Solve the following quadratic equations by factorisation method.

(i) $x^2 + 8x + 15 = 0$

(ii) $5m^2 - 22m - 15 = 0$

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4. One of the roots of the quadratic equation $kx^2 - 14x - 5 = 0$ is 5. Complete the following activity to find the value of k .

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5. Complete the following activity to determine the nature of the roots of the quadratic equation $2x^2 - 5x + 3 = 0$

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6. Determine the nature of the roots of the following quadratic equations from their discriminant :

(i) $2x^2 - 3x - 4 = 0$ (ii) $x^2 - 2x + \frac{9}{4} = 0.$

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7. Obtain a quadratic equation whose roots are -3 and -7.

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2 4 3 Marks Each

1. Solve the quadratic equation $x^2 - 12x + 32 = 0$ by completing square method :

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2. Solve the following quadratic equation $3q^2 = 2q + 8$ using formula method :

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3. α and β are the roots of $x^2 - 5x - 1 = 0$. Complete the following activity to find the value of $x^2 + \beta^3$.

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4. If α and β are the roots of the quadratic equation $x^2 - 4x - 6 = 0$, find the values of $\alpha^2 + \beta^2$.

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5. The sum of the squares of two consecutive odd natural numbers is 290. Find the numbers.

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6. In an orchard , the number of trees in each column is 5 more than that in each row. Find the number of trees in each column, if the total number of trees is 1400. Flow chart.

7. In a two-digit natural number, the digit at th etens place is equal to the square of the digit at units place. If 54 is subtracted from the

number, the digits get interchanged . Find the number.

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8. Construct a word problem on quadratic equation, such that one of its answers is 6 (years, natural numbers, rupees, etc.) Also solve it.

Word problem :

The difference between two positive integers

is 4 and the sum of their squares is 40 . Find the greater number.

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9. Example expecting the student to express his own views.

The teacher advised the students " While solving a quadratic equation using formula method, first find the value of the determinant $b^2 - 4ac$ and then proceed. " Clarify in your own words the reason for this advice.

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Assignment 2 1

1. Which of the following is not a quadratic equation ?

A. $\frac{y^2}{2} = 2y + 7$

B. $\frac{6}{y} - 5 - y = 0$

C. $y - 18 = 7y$

D. $(y - 3)(y + 3) = 0$

Answer: C

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2. Which of the following is the value of the discriminant for the quadratic equation $2x^2 + 5\sqrt{3}x + 6 = ?$

A. 27

B. 72

C. 123

D. $25\sqrt{3} - 48$

Answer: A

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3. What is the nature of the rootsof the quadratic equation $4x^2 - 8x + 9 = 0$?

A. Real

B. Not real

C. Real and equal

D. Real and unequal

Answer: B

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4. For which of the following quadratic equations is $\alpha + \beta = 5$?

A. $2x^2 + 10x + 25 = 0$

B. $x^2 - 10x + 25 = 0$

C. $3x^2 + 15x - 16 = 0$

D. $3x^2 - 15x + 16 = 0$

Answer: D

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5. What is the value of k for which the quadratic equation $3x^2 - kx + k = 0$ has equal roots ?

A. 3

B. 6

C. 9

D. 12

Answer: D

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6. If one of the roots of the quadratic equation $kx^2 + 2x - 8 = 0$ is -2, then what is the value of k ?

A. 2

B. 3

C. 1

D. 4

Answer: B

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7. The roots of which of the following quadratic equations are 2 and -5 ?

A. $x^2 + 3x + 10 = 0$

B. $x^2 - 3x + 10 = 0$

C. $x^2 + 3x - 10 = 0$

D. $x^2 - 3x - 10 = 0$

Answer: C

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8. What are the roots of the quadratic equation $\sqrt{2x^2 + 9} = 9$?

A. $6, \ -6$

B. 3,-3

C. 2,-2

D. $6, 0$

Answer: A

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Assignment 2 2

1. Write the value of $\alpha + \beta$ and $\alpha\beta$, if (i) $a = 3, b = 6, c = 9$ (ii) $a = 2, b = -8, c = 5$

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2. Write the value of a,b,c for the following quadratic equations :

(i) $2x^2 - 3x + 7 = 0$ (iI) $5x^2 - 2 = -6x$

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3. Write the quadratic equations, if

(i) $\alpha + \beta = -10, \alpha\beta = 7$ (ii) $\alpha + \beta = 4, \alpha\beta = -2$

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4. Write the roots of the following quadratic equations :

(i) $(x-3)(x-4)=0$ (ii) $x^2-x-2=0$

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5. Find the value of b^2-4ac, if

(i) $a=3, b=9, c=6$ (ii) $a=2, b=-8, c=8$

(iii) $a=1, b=1, c=1.$

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Assignement 2 3

1. Write the following quadratic equations in standard from and then write the values of a,b and c :

(i) $x^2 - 9 = 13x$ (ii) $2x^2 = 3x$

(iii) $x + \frac{5}{x} = -3$ (iv) $(x + 4)(x - 10) = 0$

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2. Determine the nature of the roots of the following quadratic equations from their

discriminant :

(i) $3y^2 + 9y + 4 = 0$ (ii)

$2x^2 + 5\sqrt{3}x + 16 = 0$

(iii) $4x^2 + 12x + 9 = 0$ (iv)

$m^2 + \sqrt{2}m + 1 = 0$

(v) $x^2 - \frac{1}{2}x + \frac{1}{16} = 0$ (vi)$x^2 - 4x - 4 = 0$

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3. Solve the following quadratic equations by factorisation method :

(i) $x^3 - 4x + 3 = 0$ (ii) $m^2 - m - 2 = 0$ (iii)

$p^2 + 9p + 20 = 0$

(iv)$q^2 + q - 12 = 0$ (v) $y^2 + 2y - 35 = 0$ (vi)

$3x^2 + 5x = 0$

(vii) $x^2 - 7x + 12 = 0$ (viii) $x^2 - 7x - 18 = 0$

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4. Find the value of k, if one of the roots of the quadratic equation :

(i) $x^2 - kx + 12 = 0$ is 3 (ii) $kx^2 - 11x + 12 = 0$ is 4

(iii) $6p^2 5p + k = 0$ I s $-\frac{3}{2}$ (iv) $kx^2 - 11x - 6 = 0$ is $-\frac{1}{2}$

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5. Complete the following activity to solve the quadratic equation $\sqrt{3}x^2 + 4x - 7\sqrt{3} = 0$ by factorisation method :

$\sqrt{3}x^2 + 4x - 7\sqrt{3} = 0$

$\therefore \sqrt{3}x^2 + \square - 3x - 7\sqrt{3} = 0$

$\therefore x\left(\sqrt{3}x + \right) - \sqrt{3}\left(\sqrt{3}x + 7\right) = 0$

$\therefore (\quad)\left(x - \sqrt{3}\right) = 0$

$\therefore \sqrt{3}x + 7 = 0$ or $\square = 0$

$\therefore x = \dfrac{-7}{\sqrt{3}}$ or $x = \square$

$\therefore \dfrac{-7}{\sqrt{3}}$ and $\sqrt{3}$ are the roots of the equation.

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6. Complete the following activity to find the value of k, if the roots of $2x^2 - 6x + k = 0$ are real and equal.

Here, a=2,b= -6 ,c = k .

The roots are real and equal.

$\therefore b^2 - 4ac = \square$

$b^2 - 4ac = \square - 4(2)(k) = 0$

$\therefore \square - 8k = 0$

$\therefore 8k = 36 \therefore k = \square$

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7. For a quadratic equation whose roots are 4 and -12.

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Assignement 2 4

1. Solve the following quadratic equations by completing square method :

(i) $x^2 + 8x - 48 = 0$ (ii) $x^2 - 4x - 3 = 0$

(iii) $9x^2 - 12x + 2 = 0$ (iv) $x^2 + 8x + 9 = 0$

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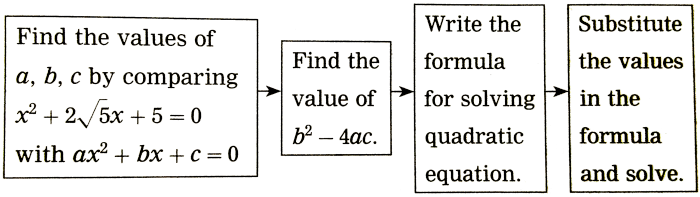
2. Solve using formula :

(i) $x^2 - 4x - 5 = 0$ (ii) $x^2 - 7x - 3 = 0$

(iii) With the help of flow chart given below solve the equation $x^2 + 2\sqrt{5}x + 5 = 0$ using

the formula :



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3. If $\alpha + \beta = 8$ and $\alpha^2 + \beta^2 = 34$, find the quadratic equation whose roots are α and β.

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4. Find the quadratic equation, if one of the roots is $\sqrt{5}-\sqrt{3}$ and other is $\sqrt{5}+\sqrt{3}$.

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5. Solve the following problems :

(i) The sume of a natural number and its reciprocal is $\frac{50}{7}$. Find the number.

(ii) In a two-digit , the digit at the units place is equal to the square of the digit at tens place. If 18 is added to the number, the digits get

interchanged. Find the number.

(iii) If the speed of a car is decreased by 8 km / h , it takes 1 hour more to cover a distance of 240 km. Find the original speed of the car.

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6. If $\alpha$and β are the roots of the quadratic equation $x^2 - 2x - 7 = 0$, find the value of $\alpha^2 + \beta^2$.

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7. One of the roots of the quadratic equation $5x^2 + 2x + k = 0$ is $-\frac{7}{5}$. Complete the following activity to find the value of k.

$-\frac{7}{5}$ is the root of the quadratic equation $5x^2 + 2x + k = 0$.

$\therefore$ Substitute $x = -\frac{7}{5}$ in the equation

$\therefore 5 \times \square + 2 \times \square + k = 0$

$\therefore \square - \square + k = 0$

$\therefore \square + k = 0$

$\therefore k = \square$

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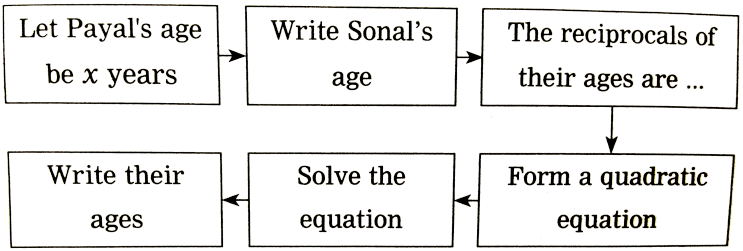
8. The difference between the ages Sonal and Payal is 12 years. The sum of the reciprocals of their ages is $\frac{1}{8}$. Find their ages. (Sonal is elder to Payal).



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