Quadratic Equations

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What is known as quadratic equation?

When these quadratic polynomials are equated to zero, equation is formed and is known as a quadratic equation.

The standard form of quadratic equation is $ax^2 + bx + c = 0$. Here a, b, c are real numbers and $a \neq 0$. The power of x in the equation must be a non-negative integer.

Examples of quadratic equation

(i) $3x^2 - 6x + 1 = 0$ is a quadratic equation.

(ii) $x + (1/x) = 5$ is a quadratic equation.
On solving, we get $x \times x + (1/x) \times x = 5 \times x$
$\Rightarrow x^2 + 1 = 5x$
$\Rightarrow x^2 - 5x + 1 = 0$

(iii) $\sqrt{2}x^2 - x - 7 = 0$ is a quadratic equation.

(iv) $3x^2 - \sqrt{x} + 1 = 0$ is not a quadratic equation, since the power of x must be a positive integer.

$x^2 - x^{-1} + 7 = 0$

(v) $x^2 - (1/x) + 7 = 0$ is not a quadratic equation, since on solving it becomes an equation of degree 3.

(vi) $x^2 - 4 = 0$ is a quadratic equation.

$ax^2 + bx + c = 0$ &

$\underline{\underline{a \neq 0}}$

(vii) $x^2 = 0$ is a quadratic equation.

$$\left.\begin{array}{l} x^2+5x+6=0 \\ x^2+5x=0 \\ x^2+6=0 \\ x^2=0 \end{array}\right\} \text{Quadratic equation}$$

Note: Degree of quadratic equation = 2
" " Linear equations = 1

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Q. Solve the given Quadratic equations.

(i) $x^2+5x+6=0$ $(ax^2+bx+c=0)$

Soln: $a \times c = 1\times 6 = 6$

$b = 5 \rightarrow b_1 \,\&\, b_2$

Such that $b_1+b_2=b$ &

$(b_1 \times b_2) = (a \times c)$

$$\underbrace{x^2+2x}+\underbrace{3x+6}=0$$

$$\underbrace{x(x+2)}+\underbrace{3(x+2)}=0$$

$$(x+2)\times(x+3)=0$$

$x+2=0$ OR $x+3=0$

$x=-2$ OR $x=-3$

$\therefore$ Solution set $=(-2,-3)$

(ii) $x^2+6x+5=0$

Soln:

$$x^2+5x+x+5=0$$

$$x(x+5)+1(x+5)=0$$

$$(x+5)(x+1)=0$$

$x+5=0$ or $x+1=0$

$x=-5$ or $x=-1$

$\therefore$ Solution set $=(-5,-1)$

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Q: Solve: $(x-7)(x-9) = 195$

Soln: $x(x-9) - 7(x-9) = 195$

$x^2 - 9x - 7x + 63 = 195$

$x^2 - 16x + 63 - 195 = 0$

$x^2 - 16x - 132 = 0$

$x^2 - 22x + 6x - 132 = 0$

$x(x-22) + 6(x-22) = 0$

$(x-22)(x+6) = 0$

$x - 22 = 0$ OR $x + 6 = 0$

$x = 22$ OR $x = -6$

$\therefore$ Solution set $= (22, -6)$

Solve: $\frac{x}{3} + \frac{3}{x} = 4\frac{1}{4}$

$\frac{x}{3} + \frac{3}{x} = \frac{17}{4}$

$\frac{x^2+9}{3x} = \frac{17}{4} \Rightarrow 4(x^2+9) = 17(3x)$

$\Rightarrow 4x^2 + 36 = 51x \Rightarrow 4x^2 - 51x + 36 = 0$

144

2 72

3 48

$\Rightarrow 4x^2 - 48x - 3x + 36 = 0$

$\Rightarrow 4x(x-12) - 3(x-12) = 0$

$\Rightarrow (4x-3)(x-12) = 0$

$4x - 3 = 0$ OR $x - 12 = 0$

$4x = 3$ $x = 12$

$\Rightarrow x = 3/4$ $x = 12$

$\therefore$ Solution set $= (3/4, 12)$

Solve: $2x^2 - 5x + 3 = 0$

Soln:

$$2x^2 - 2x - 3x + 3 = 0$$
$$2x(x-2) - 3(x-2) = 0$$
$$(2x-3)(x-2) = 0$$
$$\Rightarrow 2x - 3 = 0 \quad \text{or} \quad x - 2 = 0$$
$$\Rightarrow x = \frac{3}{2} \qquad x = 2$$

$\therefore$ solution set $= \left\{\frac{3}{2}, 2\right\}$

Q. Find the integral value of x (i.e $x \in Z$) which satisfy $3x^2 - 2x - 8 = 0$

Soln:

$$3x^2 - 2x - 8 = 0$$
$$3x^2 - 6x + 4x - 8 = 0$$
$$3x(x-2) + 4(x-2) = 0$$
$$(3x+4)(x-2) = 0$$
$$\Rightarrow 3x + 4 = 0 \qquad x - 2 = 0$$
$$\Rightarrow 3x = -4 \qquad x = 2$$
$$x = -4/3 \qquad x = 2$$

-24

2 12

3 8

4 -6

$\therefore$ Since $x \in Z$ $\therefore$ Ignore $x = -4/3$

$\therefore$ soln set $= (x = 2)$

(iii) $8x^2 = 21 + 22x$

$8x^2 - 22x - 21 = 0$

$-(8 \times 21) = -168$

-168: 2×84, 3×56, 4×42, 6×-28

$\underbrace{8x^2 - 28x}\ \underbrace{+6x - 21} = 0$

$4x(2x-7) + 3(2x-7) = 0$

$(2x-7)(4x+3) = 0$

$2x - 7 = 0$ OR $4x + 3 = 0$

$2x = 7$ $\qquad$ $4x = -3$

$x = \frac{7}{2}$ $\qquad$ $x = -3/4$

$\therefore$ soln set $= \left(\frac{7}{2}, \frac{-3}{4}\right)$

(iv) $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}$

$\Rightarrow \frac{(x-7) - (x+4)}{(x+4)(x-7)} = \frac{11}{30}$ $\Rightarrow \frac{\cancel{x} - 7 - \cancel{x} - 4}{x^2 - 3x - 28} = \frac{11}{30}$

$\Rightarrow \frac{-11}{x^2 - 3x - 28} = \frac{11}{30}$

$\Rightarrow 30(-11) = 11(x^2 - 3x - 28)$

$\Rightarrow -330 = 11x^2 - 33x - 308$

$\Rightarrow 11x^2 - 33x - 308 + 330 = 0$

$\Rightarrow 11x^2 - 33x + 22 = 0$ $\quad (\div 11)$

$\Rightarrow x^2 - 3x + 2 = 0$ $\Rightarrow x^2 - 2x - x + 2 = 0$

$\Rightarrow x(x-2) - 1(x-2) = 0$

$\Rightarrow (x-1)(x-2) = 0$

$\Rightarrow x - 1 = 0$ OR $x - 2 = 0$ $\Rightarrow \boxed{x = 1}$ $\boxed{x = 2}$

(v) solve by factorization Method

$$x^2+(4-3y)x-12y=0$$
$$x^2+4x-3xy-12y=0$$
$$x(x+4)-3y(x+4)=0$$

$$(x+4)(x-3y)=0$$
$$\Rightarrow x+4=0 \quad \text{OR} \quad x-3y=0$$
$$x=-4 \quad \text{OR} \quad x=3y$$

$\therefore$ solution set $=(-4, 3y)$

Q. Find the solution set of the given equation $3x^2-8x-3=0$ when
(i) $x \in Z$ (integers)
(ii) $x \in Q$ (Rational numbers)

Soln: $3x^2-9x+x-3=0$
$$3x(x-3)+1(x-3)=0$$
$$(3x+1)(x-3)=0$$
$$3x+1=0 \quad \text{OR} \quad x-3=0$$
$$x=-\tfrac{1}{3} \qquad x=3$$
$\therefore$ soln set $=\{-\tfrac{1}{3}, 3\}$
(i) when $x \in Z$, $S.S=\{3\}$
(ii) when $x \in Q$ $S.S=\{\frac{-1}{3}, 3\}$

Q: Solve for x: $(2x-3)^2=25$

(v) $\dfrac{2x-3}{x+2} = \dfrac{3x-7}{x+3}$

(vi) $\dfrac{x+1}{x-1} - \dfrac{x-1}{x+1} = \dfrac{5}{6}$

(vii) $9x - \dfrac{162}{x} - 63 = 0$

(viii) $(4-3x)(2x+3) = 5x$

(ix) $\dfrac{15}{15-x} = \dfrac{3x}{10}$

(x) $\dfrac{4}{x+4} - \dfrac{1}{(x+1)} = \dfrac{2}{x+2}$

Soln: (vi) $\dfrac{(x+1)(x+1)-(x-1)(x-1)}{(x-1)(x+1)} = \dfrac{5}{6}$

$$\frac{(x^2+2\times x\times 1+1^2)-(x^2-2\times x\times 1+1)^2}{x^2-1^2} = \frac{5}{6}$$

$[(a+b)^2 = a^2+2ab+b^2$
$(a-b)^2 = a^2-2ab+b^2$
$(a+b)(a-b) = a^2-b^2]$

$$\frac{\cancel{x^2}+2x+\cancel{1}-\cancel{x^2}+2x-\cancel{1}}{x^2-1} = \frac{5}{6}$$

$\Rightarrow \dfrac{4x}{x^2-1} = 5/6 \Rightarrow 6\times 4x = 5(x^2-1)$
$24x = 5x^2-5$

$5x^2-24x-5=0 \Rightarrow 5x^2-25x+x-5=0$

$5x(x-5)+1(x-5)=0 \Rightarrow (5x+1)(x-5)=0$

$x = -1/5, \quad x = 5$

Solving Quadratic equation by formula method

$$ax^2+bx+c=0$$

Discriminant (D) = b^2-4ac

Roots are :→ $\frac{-b+\sqrt{D}}{2a}$, $\frac{-b-\sqrt{D}}{2a}$

Nature of roots

If $b^2-4ac = D$ is

(i) $= 0$ → Roots are real and equal

(ii) > 0 → Roots are real and unequal

(iii) < 0 → Roots are imaginary

Also,

Sum of roots $= \frac{-b}{a} \Rightarrow (\alpha+\beta) = \frac{-b}{a}$

Product of roots $= \frac{c}{a} \Rightarrow \alpha\beta = \frac{c}{a}$

If roots are given as α & β

Relationship between the roots and the eqn

$x^2 - (\text{sum of roots})x + \text{Product of roots} = 0$

OR $x^2 - (\alpha+\beta)x + \alpha\times\beta = 0$

Q. Solve the given quadratic equation and give your answer correct to two decimal places.

$$5x(x+2) = 3$$

Soln: $5x^2 + 10x - 3 = 0$

$(ax^2 + bx + c = 0)$

$a = 5$, $b = 10$, $c = -3$

$\therefore D = b^2 - 4ac = (10)^2 - 4 \times 5 \times (-3)$

$= 100 + 60 = 160$

$\therefore$ Roots are $\dfrac{-b + \sqrt{D}}{2a}$, $\dfrac{-b - \sqrt{D}}{2a}$

$= \dfrac{-10 + \sqrt{160}}{2 \times 5}$, $\dfrac{-10 - \sqrt{160}}{2 \times 5}$

$= \dfrac{-10 + 12.64}{10}$, $\dfrac{-10 - 12.64}{10}$

$= \dfrac{2.64}{10}$ $\quad$ $\dfrac{-22.64}{10}$

$= 0.264$ $\quad$ -2.264

$\therefore$ Roots are $(0.26$ & $-2.26)$

HW: Solve for x

$$x - \frac{18}{x} = 6$$

Soln: $\dfrac{x^2 - 18}{x} = 6 \Rightarrow x^2 - 18 = 6x$

$\Rightarrow x^2 - 6x - 18 = 0$ $\quad$ $a = 1$, $b = -6$, $c = -18$

$\therefore D = b^2 - 4ac = (-6)^2 - 4 \times 1 \times -18 \Rightarrow 36 + 72 = 108 > 0$

$\therefore$ Roots are $\dfrac{-b \pm \sqrt{D}}{2a} = \dfrac{-(-6) \pm \sqrt{108}}{2 \times 1} = \dfrac{6 \pm 10.40}{2}$

$\therefore x_1 = \dfrac{6 + 10.40}{2}$, $x_2 = \dfrac{6 - 10.40}{2} = \dfrac{-4.4}{2} = -2.2$

$= 8.20$

$\therefore$ Roots are $(8.20, -2.20)$

The roots of quadratic equation $5x^2 - 4x + 5 = 0$ are

(i) Real & equal (ii) Real & unequal
(iii) Not real (iv) Non-real & equal

Soln: $a=5, b=-4, c=5$

$b^2-4ac = (-4)^2 - 4\times5\times5$

$= 16-100 = -84 < 0$

Equation $(x+1)^2 - x^2 = 0$ has _____ real root(s).

(A) 1 (B) 2 (C) 3 (D) 4

Soln: $(a+b)^2 = a^2+b^2+2ab$

$= x^2+1+2x$

$\cancel{x^2}+1+2x-\cancel{x^2} = 0 \Rightarrow 2x+1=0$

If 1/2 is a root of the equation $x^2 + kx - (5/4) = 0$ then the value of k is

Soln: $\left(\frac{1}{2}\right)^2 + k\times\frac{1}{2} - \frac{5}{4} = 0$

$\frac{1}{4} + \frac{2k}{4} - \frac{5}{4} = 0$

$\frac{1+2k-5}{4} = 0 \Rightarrow 2k-4=0$

$k = 4/2 = 2$

A natural number, when increased by 12, equals 160 times its reciprocal. Find the number.

(A) 3 ~~(B)~~ 8 (C) 4 (D) 7

Sol^n:

$$x + 12 = 160\left(\frac{1}{x}\right)$$

$$x(x+12) = 160$$

$$x^2 + 12x - 160 = 0$$

$$x^2 + 20x - 8x - 160 = 0$$

$$x(x+20) - 8(x+20) = 0 \qquad (x-8)(x+20) = 0$$

$$x = 8, \quad x = -20$$

Natural no

$$\therefore \boxed{x = 8}$$

If $p^2x^2 - q^2 = 0$, then x =?

~~(A)~~ $\pm q/p$ (B) $\pm p/q$ (C) p (D) q

$$p^2x^2 = q^2 \Rightarrow x^2 = \frac{q^2}{p^2} \quad \therefore x = \sqrt{\frac{q^2}{p^2}} = \pm\frac{q}{p}$$

If the one root of the equation $4x^2 - 2x + p - 4 = 0$ be the reciprocal of other. Then value of p is

(A) 8 (B) – 8 (C) – 4 (D) 4

$$\alpha\beta = \frac{c}{a} \Rightarrow \alpha\beta = \frac{p-4}{4} \qquad \alpha, \left(\frac{1}{\alpha} = \beta\right)$$

$$\alpha \times \frac{1}{\alpha} = \frac{p-4}{4} \Rightarrow p - 4 = 4$$

$$p = 4 + 4 \Rightarrow \boxed{p = 8}$$

The sum of two numbers is 27 and product is 182. The numbers are:

(a) 12 and 13 (b) 13 and 14 (c) 12 and 15 (d) 13 and 24

Which one of the following is not a quadratic equation?

(a) $(x + 2)^2 = 2(x + 3)$

(b) $x^2 + 3x = (-1)(1 - 3x)^2$

(c) $(x + 2)(x - 1) = x^2 - 2x - 3$

(d) $x^3 - x^2 + 2x + 1 = (x + 1)^3$

(c) $x(x-1)+2(x-1) = x^2-2x-3$

$\cancel{x^2}-x+2x-2 = \cancel{x^2}-2x-3$ No term containing x^2

The quadratic equation whose one rational root is $3 + \sqrt{2}$ is

(a) $x^2 - 7x + 5 = 0$

(b) $x^2 + 7x + 6 = 0$

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

(d) $x^2 - 6x + 7 = 0$

$\underbrace{(3+\sqrt{2})}_{\alpha}, \underbrace{(3-\sqrt{2})}_{\beta}$

$\alpha+\beta = 3+\sqrt{2}+3-\sqrt{2} = 6$

$\alpha\beta = (3+\sqrt{2})(3-\sqrt{2})$

$= (3)^2-(\sqrt{2})^2 = 7$

$x^2-(\alpha+\beta)x+\alpha\beta = 0$

$\Rightarrow x^2-(6)x+7 = x^2-6x+7 = 0$

Without solving, comment upon the nature of roots of each of the following equations: $[b^2-4ac]$

(a) $7x^2 - 9x + 2 = 0$ $(-9)^2 - 4\times7\times2 = 81-56 = 25 > 0$ → Real & unequal

(b) $6x^2 - 13x + 4 = 0$ $(-13)^2 - 4\times6\times4 = 169 - 96 > 0$ "

(c) $25x^2 - 10x + 1 = 0$ $(-10)^2 - 4\times25\times1 = 100-100 = 0$ Real & equal

(d) $x^2 + 2\sqrt{3}\,x - 9 = 0$ $(2\sqrt{3})^2 - 4\times1\times(-9) = 12+36>0$ " & unequal

(~~e~~) $x^2 - ax + b^2 = 0$ $(-a)^2 - 4\times a\times b^2 = a^2 - 4ab^2$

(f) $2x^2 + 8x + 9 = 0$ $(8)^2 - 4\times2\times9 = 64-72 < 0$ not real or imaginary

Find the value of 'p', if the following quadratic equation has equal roots: $4x^2 - (p - 2)x + 1 = 0$ $(b^2-4ac=0)$

$\{-(P-2)\}^2 - 4\times4\times1 = 0 \Rightarrow P^2+4-4P-16=0$

$P^2-4P-12=0 \Rightarrow P^2-6P+2P-12=0$

$P(P-6)+2(P-6)=0 \Rightarrow (P+2)(P-6)=0 \Rightarrow P+2=0$ OR $P-6=0$

$\Rightarrow \boxed{P=-2}$ $\boxed{P=6}$

Prove that each of the following equation has only one solution. Find the solution.

(a) $4y^2 - 28y + 49 = 0$ $(b^2-4ac=0)$

$(-28)^2 - 4\times4\times49$

$= 784-784=0 \Rightarrow D=0$

Roots $= \dfrac{-b}{2a}$ $\dfrac{-b\pm\sqrt{b^2-4ac}}{2a}$

$\dfrac{-(-28)}{2\times4} = \dfrac{28}{8} = \dfrac{7}{2}$

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The equation $3x^2 - 12x + z - 5 = 0$ has equal roots. Find the value of z.

Soln: Since the roots are equal

$\Rightarrow b^2 - 4ac = 0$

$(-12)^2 - 4 \times 3 \times (z-5) = 0$

$144 - 12(z-5) = 0$

$144 = 12(z-5)$

$\frac{144}{12} = z-5 \quad \Rightarrow z-5 = 12$

$z = 12+5 = 17$

Find k for which the equation $4x^2 + kx + 9 = 0$ will be satisfied by only one real value of x. Also find the solution.

Soln: $b^2 - 4ac = 0$

$(k)^2 - 4 \times 4 \times 9 = 0$

$k^2 = 144 \quad \therefore k = \sqrt{144} = \pm 12$

$4x^2 + 12x + 9 = 0$ OR $4x^2 - 12x + 9 = 0$

$\therefore$ Roots $= \frac{-b}{2a} = \frac{-(12)}{2 \times 4}$ OR $\frac{-(-12)}{2 \times 4}$

$= \frac{-12}{8}$ $\quad \frac{12}{8}$

$= \left(-\frac{3}{2}, \frac{3}{2}\right)$

For what value of k will each of the following equations give equal roots? Also, find the solution for that value of k.

(a) $3x^2 + kx + 2 = 0$

(b) $kx^2 - 4x + 1 = 0$

(c) $5x^2 + 20x + k = 0$

(d) $(k - 12)x^2 + 2(k - 12)x + 2 = 0$

If ½ is a root of the quadratic equation $x^2-mx-5/4=0$, then value of m is:

The roots of quadratic equation $2x^2 + x + 4 = 0$ are:

(a) Positive and negative **(b) Both Positive**

(c) Both Negative **(d) No real roots**

If one root of equation 4x2-2x+k-4=0 is reciprocal of the other. The value of k is:

(a) -8 (b) 8 (c) -4 (d) 4

$\alpha, \frac{1}{\alpha}$ $\alpha \times \frac{1}{\alpha} = \frac{k-4}{4}$ $\left[\text{product of roots} = \frac{c}{a}\right)$

$4 = k-4 \quad \therefore k = 4+4 = 8$

(i) $\left(\frac{1}{2}\right)^2 - m\left(\frac{1}{2}\right) - \frac{5}{4} = 0$

$\frac{1}{4} - \frac{m}{2} - \frac{5}{4} = 0 \Rightarrow \frac{1}{4} - \frac{5}{4} = +\frac{m}{2}$

$-\frac{4}{4} = \frac{m}{2} \Rightarrow \boxed{m = -2}$

The product of two consecutive positive integers is 306. To find the integers, this can be represented in the form of quadratic equation as

(a) x2 + x + 360 = 0

(b) $x^2 + x - 360 = 0$

(c) $2x^2 + x - 360$

(d) $x^2 - 2x - 360 = 0$

The equation which has the sum of its roots as 3 is

(a) $2x^2 - 3x + 6 = 0$ $3/2$

✓**(b) $-x^2 + 3x - 3 = 0$** $-3/-1 = +3$

(c) $\sqrt{2}x^2 - 3/\sqrt{2}x + 1 = 0$ $\frac{3}{\sqrt{2}} \div \sqrt{2} = \frac{3}{\sqrt{2} \times \sqrt{2}} = \frac{3}{2}$

(d) $3x^2 - 3x + 3 = 0$ $\frac{3}{3} = 1$

The product of the digits of a two-digit number is 12. If 36 is added to the number, a number is obtained which is the same as the number obtained by reversing the digits of the original number.

Solution:

Let the digit at the units place be x and that at the tens place be y.

Then, the number = 10y + x.

The number obtained by reversing the digits = 10x + y

From the question, xy = 12 .... (i)

10y + x + 36 = 10x + y .... (ii)

From (ii), 9y - 9x + 36 = 0

$\Rightarrow$ y – x + 4 =0

$\Rightarrow$ y = x – 4 .... (iiii)

Putting y = x- 4 in (i), x(x – 4) =12

$\Rightarrow x^2 - 4x - 12 = 0$

$\Rightarrow x^2 - 6x + 2x - 12 = 0$

$\Rightarrow x(x - 6) + 2(x - 6) = 0$

$\Rightarrow (x - 6)(x + 2) = 0$

$\Rightarrow x - 6 = 0$ or $x + 2 = 0$

$\Rightarrow x = 6$ or $x = -2$

But a digit in a number cannot be negative. So, $x \neq -2$.

Therefore, x = 6.

Therefore, from (iii), y = x – 4 = 6 – 4 = 2.

Thus, the original number 10y + x = 10 × 2 + 6 = 20 + 6 = 26.

Find a positive number, which is less than its square by 30.

Solution:

Let the number be x

By the condition, $x^2 - x = 30$

$\Rightarrow x^2 - x - 30 = 0$

$\Rightarrow (x - 6)(x + 5) = 0$

$\Rightarrow$ Therefore, $x = 6, -5$

As the number is positive, $x = -5$ is not acceptable, Thus the required number is 6.

An association has a fund of Rs.195. In addition that, each member of the association contributes the number of dollars equal to the number of members. The total money is divided equally among the members. If each of the members gets Rs. 28, find the number of members in the association.

Let the number of members be x.

Total contributions from them = $ x2 and the association has a fund of $ 195.

According to the problem,

$x^2 + 195 = 28x$

$\Rightarrow x^2 - 28x + 195 = 0$

$\Rightarrow x^2 - 15x - 13x + 195 = 0$

$\Rightarrow x(x - 15) - 13(x - 15) = 0$

$\Rightarrow (x - 15)(x - 13) = 0$

Therefore, x = 15 or 13

There are 15 or 13 members in the association.

1. The difference of two positive integers is 3 and the sum of their squares is 117; find the numbers.

2. The product of two consecutive positive odd integers is 2499. Find the bigger integer.

3. The product of two positive consecutive even integer is 168. Assuming the smaller integer to be x, frame an equation for the statement and find the numbers.

4. For every litre of petrol, one car travels x km and another car travels 5 km more than the first. If the first car uses 4 litres more than the second car in converting 400 km, frame an equation for the statement to find x. What is the value of x?

5. The product of two consecutive integers is 3906. Find the integers.

If the roots of a quadratic equation are 2 and 3, then the equation is

(a) $x^2 + 5x + 6 = 0$ (b) $x^2 + 5x – 6 = 0$ (c) $x^2 – 5x – 6 = 0$ (d) $x^2 – 5x + 6 = 0$

Roots of the equations $x^2 – 3x + 2 = 0$ are

(a) 1, –2 (b) –1, 2 (c) –1, –2 (d) 1, 2

If the roots of a quadratic equation are equal, than discriminant is

(a) 1		**(b) 0**		**(c) greater than 0**		**(d) less than zero.**

If one root of $2x^2 + kx + 1 = 0$ is 1 – , 2 then the value of 'k' is

(a) 3 (b) –3 (c) 5 (d) –5

The sum of the roots of the quadratic $5x^2 – 6x + 1 = 0$ is

(a) 6/ 5 (b) 1/ 5 (c) - 5/ 6 (d) - 1/ 5

If the roots of the quadratic $2x^2 + kx + 2 = 0$ are equal then the value of 'k' is

(a) 4 (b) –4 (c) ± 4 (d) ± 16

For $ax^2 + bx + c = 0$, which of the following statement is wrong?

(a) If $b^2 - 4ac$ is a perfect square, the roots are rational.
(b) If $b^2 = 4ac$, the roots are real and equal.
(c) If $b^2 - 4ac$ is negative, no real roots exist.
(d) If $b^2 = 4ac$, the roots are real and unequal.

The roots of the equation $9x^2 - bx + 81 = 0$ will be equal, if the value of b is

(a) ± 9 (b) ± 18 (c) ± 27 *(d) ± 54*

For what value of t is $x=2/3$ a solution of $7x^2 + tx - 3 = 0$

(a) -6
(b) -1/6
(c) 1/6
(d) 6

The value of p for equation $2x^2 - 4x + p = 0$ to have real roots will be

(a) $p \leq -2$
(b) $p \geq 2$
(c) $p \leq 2$
(d) $p \geq -2$

Roots of quadratic equation $x^2 - 3x = 0$, will be

(a) 3
(b) 0, –3
(c) 0, 3
(d) none of these

Value of D when root of $ax^2 + bx + c = 0$ are real and unequal will be

(a) $D \geq 0$
(b) $D > 0$
(c) $D < 0$
(d) $D = 0$

If equation $9x^2 + 6px + 4 = 0$ has equal roots, then both roots are equal to

(a) $\pm\frac{2}{3}$ (b) ± 3
(c) $\pm\frac{3}{2}$ (d) 0

If the equation $x^2 - kx + 1$, have no real roots, then

(a) $-2 < k < 2$
(b) $-3 < k < 3$
(c) $k > 2$
(d) $k < -2$

Every quadratic polynomial can have at most

(a) three zeros
(b) one zero
(c) two zeros
(d) none of these