Pakistan School
Kingdom of Bahrain

WELCOME CLASS 10TH (SCIENCE)

Quadratic Equations

Objectives

Students will be able to:

Solve equations which are convertible to quadratic equations

Q. Solve the following equations

(12). $4.2^{2x+1}-9.2^{x}+1=0$

Solution: $4.2^{2x+1}-9.2^{x}+1=0$

$4.2^{2x}.2^{1}-9.2^{x}+1=0$

$8.(2^{x})^{2}.-9.2^{x}+1=0$

Let $2^{x}=y \quad (2^{x})^{2}=y^{2}$

$8y^{2}-9y+1=0$

$8y^{2}-8y-y+1=0$

$8y(y-1)-1(y-1)=0$

$(8y-1)(y-1)=0$

$8y-1=0 \quad y-1=0$

$8y=1 \qquad y=1$

$y=\frac{1}{8} \qquad y=1$

Put the value of y *in above equation*

$2^{x}=y \qquad 2^{x}=1$

$2^{x}=\frac{1}{8} \qquad 2^{x}=2^{0}$

$2^{x}=\frac{1}{2^{3}} \qquad 2^{x}=2^{0}$

$2^{x}=2^{-3} \qquad x=0$

$x=-3$

$S.Set=\{-3,0\}$

(14). $2^x + 64.2^{-x} - 20 = 0$

Solution:

$$2^x + 64.2^{-x} - 20 = 0$$

$$2^x + \frac{64}{2^x} - 20 = 0 \quad \text{.....(1)}$$

Let $2^x = y$ .....(2)

Put $2^x = y$ *in eq.*(1)

$$y + \frac{64}{y} - 20 = 0$$

Multiply both sides by " y "

$$y^2 + 64 - 20y = 0$$

$$y^2 - 20y + 64 = 0$$

$$y^2 - 16y - 4y + 64 = 0$$

$$y(y-16) - 4(y-16) = 0$$

$$(y-16)(y-4) = 0$$

$y - 16 = 0$ $\qquad$ $y - 4 = 0$

$y = 16$ $\qquad$ $y = 4$

Put $y = 2^x$ *from eq.*(2)

$2^x = 16$ $\qquad$ $2^x = 4$

$2^x = 2^4$ $\qquad$ $2^x = 2^2$

$x = 4$ $\qquad$ $x = 2$

$S.Set = \{2, 4\}$

(16). $(x-1)(x-2)(x-8)(x+5)+360=0$

Solution:

$(x-1)(x-2)(x-8)(x+5)+360=0$

$[(x-1)(x-2)][(x-8)(x+5)]+360=0$

$[x^2-2x-1x+2][x^2+5x-8x-40]+360=0$

$(x^2-3x+2)(x^2-3x-40)+360=0$ .....(1)

Let $x^2-3x=y$ .....(2)

Put in equation (1)

$(y+2)(y-40)+360=0$

$y^2-40y+2y-80+360=0$

$y^2-38y+280=0$

$y^2-28y-10y+280=0$

$y(y-28)-10(y-28)=0$

$(y-28)(y-10)=0$

$y-28=0 \qquad y-10=0$

$y=28 \qquad y=10$

Put $y=x^2-3x$ *from eq.*(2)

$x^2-3x=28$

$x^2-3x-28=0$

$x^2-7x+4x-28=0$

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

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

$x-7=0 \qquad x+4=0$

$x=7 \qquad x=-4$

$x^2-3x=10$

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

$x^2-5x+2x-10=0$

$x(x-5)+2(x-5)=0$

$(x-5)(x+2)=0$

$x-5=0 \qquad x+2=0$

$x=5 \qquad x=-2$

$S.Set=\{5,-2,7,-4\}$

Activity

Q. Solve the following equation

$3^{2x+2} = 12.3^{x} - 3$

Solution

$Solution: 3^{2x+2} = 12.3^x - 3$

$3^{2x}\,3^2 - 12.(3^x) + 3 = 0$

$9(3^x)^2 - 12.(3^x) + 3 = 0 \quad .....(1)$

$Let\ 3^x = y$

$Put\ 3^x = y\ in\ eq.(1)$

$9y^2 - 12y + 3 = 0$

$9y^2 - 9y - 3y + 3 = 0$

$9y(y-1) - 3(y-1) = 0$

$(y-1)(9y-3) = 0$

$y - 1 = 0 \qquad 9y - 3 = 0$

$y = 1 \qquad 9y = 3$

$y = \frac{3}{9}$

$Put\ y = 3^x$

$3^x = 1 \qquad 3^x = \frac{1}{3}$

$3^x = 3^0 \qquad 3^x = 3^{-1}$

$x = 0 \qquad x = -1$

$S.Set = \{0, -1\}$

Homework

Ex 1.3 Remaining parts