14CW
12/05/21

QUADRATIC EQUATIONS 20

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

$\Rightarrow x^2 + 2x + 1 = 2x - 6$

$\Rightarrow x^2 + 2x + 1 - 2x + 6 = 0$

$\Rightarrow x^2 + 7 = 0$

(ii) $x^2 - 2x = (-2)(3-x)$

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

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

$\Rightarrow x^2 + (-4x) + 6 = 0$

(iii) $(x-2)(x+1) = (x-1)(x+3)$

$\Rightarrow x(x+1) - 2(x+1) = x(x+3) - 1(x+3)$

$\Rightarrow x^2 + x - 2x + 1 = x^2 + 3x - x - 3$

$\Rightarrow x^2 - x + 1 - x^2 - 2x + 3$

$\Rightarrow -3x + 3 = 0$

As, $-3x+3=0$ is not in the form of ax^2+bx+c
Hence it not follows quadratic equation.

(iv) $(x-3)(2x+1) = x(x+5)$

$\Rightarrow x(2x+1) - 3(2x+1) = x^2 + 5x$

$\Rightarrow 2x^2 + x - 6x - 3 = x^2 + 5x$

$\Rightarrow 2x^2 - x^2 - 5x - 5x - 3$

$\Rightarrow 1x^2 - 10x - 3$

(v) $(2x-1)(x-3) = (x+5)(x-1)$

$\Rightarrow 2x(x-3) - 1(x-3) = x(x-1) + 5(x-1)$

$\Rightarrow 2x^2 - 6x - x + 3 = x^2 - x + 5x - 5$

$\Rightarrow 2x^2 - 7x + 3 = x^2 + 4x - 5$

$\Rightarrow 2x^2 - x^2 - 7x + 4x + 3 - 5 = 0$

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

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

$\Rightarrow x^2+3x+1 = x^2+4-2x\times 2$

$\Rightarrow x^2+3x+1 = x^2+4-4x$

$\Rightarrow x^2-x^2+3x+4x+1-4=0$

$\Rightarrow 7x-3=0$

No, as $7x-3$ is not in the form of $ax^2+bx+c=0$.

Hence it not follows quadratic equations.

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

$\Rightarrow x^3+2^3+3x2(x+2)=2x^3-2x$

$\Rightarrow x^3-8x^3+1$

$\Rightarrow x^3+8+6x^2+12x=2x^3-2x$

$\Rightarrow x^3-2x^3+6x^2+12x+2x=0$

$\Rightarrow -1x^3+6x^2+14x=0$

(viii) $x^3-4x^2-x+1=(x-2)^3$

$\Rightarrow x^3-4x^2-x+1 = x^3-8-3x\times x\times(-2)(x-2)$

$\Rightarrow x^3-4x^2-x+1 = x^3-8+6x(x-2)$

$\Rightarrow x^3-4x^2-x+1 = x^3+6x^2-12x-8$

$\Rightarrow x^3-x^3-4x^2-6x^2-x+12x+1+8=0$

$\Rightarrow -10x^2+11x+9=0$

(2) (i) Let the breadth of the plot be x m

The area of rectangular plot is $528\ m^2$

The length of the plot $= x(2x+1)$

$\Rightarrow x(2x+1)=528$

$\Rightarrow 2x^2+x=528$

$\Rightarrow 2x^2+x-528=0$

Let the consecutive integers be x and $x+1$

(ii) The product of two consecutive positive integers $= 306$

Integers $=$

$\Rightarrow x(x+1) = 306$

$\Rightarrow x^2 + x - 306 = 0$

(iii) Let Rohan's age $= x + 26$

3 yrs hence,

Rohan's age $= x + 3$

Mother's age $= x + 26 + 3$

$= x + 29$

It is given that the product of their ages after 3 yrs is 360

$(x+3)(x+29) = 360$

$\Rightarrow x^2 + 32x - 273 = 0$

(iv) Let the speed of train be x km/h.

Time taken to travel 480 km $= \frac{480}{x}$ km

In 2nd condition, let the speed of train $= (x-8)$ km/h

It is also given that the train will take 3 hours to cover the same distance

Therefore, time taken to travel 480 km $= \left(\frac{480}{x} + 3\right)$ hrs.

$\Rightarrow (x-8)\left(\frac{480}{x} + 3\right) = 480$

$\Rightarrow 480 + 3x - \frac{3840}{x} - 24 = 480$

$\Rightarrow 3x^2 - 24x + 3840 = 0$

$\Rightarrow x^2 - 8x + 1280 = 0$

Speed x time = distance.