Ch 4

Exercise 4.1

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

By using the formula for $(a+b)^2 = a^2+2ab+b^2$

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

$x^2+1 = 0$

Since the above equation is in the form of $ax^2+bx+c=0$

So the equation is quadratic equation

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

By using the formula for $(a+b)^2 = a^2+2ab+b^2$

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

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

Since the above equation in the form of $ax^2+bx+c=0$

So the eq is quadratic

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

Using the formula fo $(a+b)^2 = a^2+2ab+b^2$

$x^2-x-2 = x^2+2x-3$

$3x-1=0$

Since the eq is not in the form $ax^2+bx+c=0$

The given eq is not a quadratic eq.

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(iv) Given $(n-3)(2n+1) = n(n+5)$

By using formula for $(a+b)^2 = a^2+2ab+b^2$

$= 2n^2 - 5n - 3 = n^2 + 5n$

$\Rightarrow n^2 - 10n - 3 = 0$

Since the eqn of the form $an^2+bn+c=0$

So it is a quadratic equation

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

By using the formula $(a+b)^2 = a^2+2ab+b^2$

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

$\Rightarrow n^2 - 11n + 8 = 0$

Since the equation is in the form
$an^2 + bn + c = 0$

The given equation is quadratic equation

(vi) Given $(2n-1)(n-3) = (n+5)(n-1)$

By using formula $(a+b)^2 = a^2 + 2ab + b^2$

$= 2n^2 - 7n + 3 = n^2 + 4n - 5$

$\Rightarrow n^2 - 11n + 8 = 0$

Since the equation is in the form
$an^2 + bn + c = 0$

So it is a quadratic equation

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

using formula $= (a+b)^2 = a^2+2ab+b^2$

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

$\Rightarrow x^3+14x-6x^2-8=0$

As the equation is not of the form ax^2+bx+c $=0$

it is not a quadratic equation

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

using the formula $(a+b)^2 = a^2+2ab+b^2$

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

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

$= 2x^3-13x+9=0$

Since the above equation is in the form of ax^2+bx $+c=0$

Therefore, the given eq is quadratic

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(i) Let us consider,

Breadth of the rectangular plot $= x$ m

Thus, the length of the plot $= (2x+1)$ m

As we have

Area of rectangle $= l \times b = 528$

Putting the value of l and B on the plot onto

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Formula used

$(2n+1)\times n = 528$

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

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

So the length of the plot and breadth of plot satisfies the quadratic eq $2n^2+n-528=0$ which is the required representation of the problem mathematically

(ii) The first integer number $= n$
Thus, the next consecutive positive integer $= n+1$

product of two consecutive integer
$= n\times(n+1) = 306$
$\Rightarrow n^2+n = 306$
$\Rightarrow n^2+n - 306 = 0$

So the two integers n and $n+1$ satisfying equation $n^2+n-306=0$

(iii) Age of Rohans $= n$ year
Therefore
Rohan's mother's age $= n+26$
After 3 years
Age of Rohan $= n+3$

Age of Rohan's mother $= n+26+3 = n+29$

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The product of their ages after 3 years is = 360.

$(x+3)(x+29) = 360$
$\Rightarrow x^2 + 29x + 3x + 87 = 360$
$\Rightarrow x^2 + 32x + 87 - 360 = 0$
$\Rightarrow x^2 + 32x - 273 = 0$

Age of Rohan and his mother, satisfies the equation = $x^2 + 32x - 273 = 0$, which is the required representation of the problem mathematically

(ii) speed of train = x km/h
and
Time taken to travel 480 km = $\frac{480}{x}$ km/h

As per second condition the speed of train = $(x-8)$ km/h

Also given, the train take 3 hrs to cover the same distance

Therefore, time taken to travel 480 km = $\frac{480}{x+3}$ km

Speed × Time = Distance

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

$\Rightarrow 480 + 3x - \frac{3840}{x} - 24 = 480$
$3x - \frac{3840}{x} = 24$ $\quad$ $3x^2 - 8x - 1280 = 0$