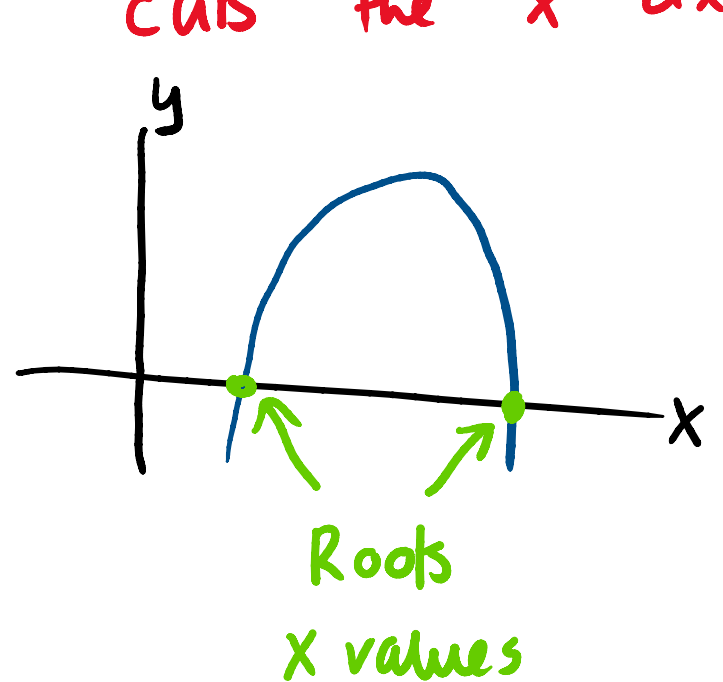


Quadratics from the roots.

Roots are the values of x where the curve cuts the x axis



Solve the quadratic to find the values of x

$$x^2 - 5x + 6 = 0$$

Factors $(x - 2)(x - 3) = -2x - 3 + 6$

Roots: Put each factor = 0 solve for x

$$\begin{cases} x-2=0 \\ +2 \mid x=2 \end{cases} \quad \begin{cases} x-3=0 \\ +3 \mid x=3 \end{cases}$$

Roots of $x^2 - 5x + 6 = 0$ are $x=2$ and $x=3$.

When given the roots and asked to form the quadratic

- ① Put the roots equal to x .
- ② Make two factors - use stabilizers
- ③ Multiply the two brackets
- ④ Answer will be a quadratic in the form $ax^2 + bx + c$

Eg1) Form the quadratic equation when the roots are 2, 3.

① Put roots = x
 $x=2$ $x=3$

HW Pg 147

Q1 + 2

Roots Root

2, 4 5, 1

② $x=2$ $x=3$
 $-2 \mid x-2=0 \mid -2$ $-3 \mid x-3=0 \mid -3$
 factor $(x-2)$ $(x-3)$

③ Multiply the factors
 $(x-2)(x-3)$
 $\downarrow \quad \quad \downarrow$
 $x(x-3) - 2(x-3)$
 $x^2 - 3x - 2x + 6$
 like terms

④ Quadratic in the $ax^2 + bx + c$
 $x^2 - 5x + 6$

① 2, 4 Roots

$x=2$ $x=4$
 $-2 \mid x-2=0 \mid -2$ $-4 \mid x-4=0 \mid -4$

Factors $(x-2)(x-4)$
 $\downarrow \quad \quad \downarrow$
 $x(x-4) - 2(x-4)$
 $x^2 - 4x - 2x + 8$

Answer: $x^2 - 6x + 8$

② Roots 5, 1

$x=5$ $x=1$
 $-5 \mid x-5=0 \mid -5$ $-1 \mid x-1=0 \mid -1$

Factors $(x-5)(x-1)$
 $\downarrow \quad \quad \downarrow$
 $x(x-1) - 5(x-1)$
 $x^2 - 1x - 5x + 5$

Ans = $x^2 - 6x + 5$

Q10) Root -5, -4

$x=-5$ $x=-4$
 $+5 \mid x+5=0 \mid +5$ $+4 \mid x+4=0 \mid +4$

Factors $(x+5)(x+4)$
 $\downarrow \quad \quad \downarrow$
 $x(x+4) + 5(x+4)$
 $x^2 + 4x + 5x + 20$

Ans = $x^2 + 9x + 20$

Q14) $\frac{1}{2}, -\frac{1}{2}$

$x = \frac{1}{2}$ $x = -\frac{1}{2}$
 multiply x^2 by 2
 $-1 \mid 2x-1=0 \mid -1$ $+1 \mid 2x+1=0 \mid +1$

Factors $(2x-1)(2x+1)$
 $\downarrow \quad \quad \downarrow$
 $2(2x+1) - 1(2x+1)$
 $4x^2 + 2x - 2x - 1$
 cancell.

Answer = $4x^2 - 1$

Pg 144 Q1 Section 8.3

$x^2 + x = 72$. Must = 0 to be able to solve
 $-72 \mid x^2 + x - 72 = 0 \mid -72$

Brackets to solve the quadratic

$x^2 + 1x - 72 = 0$ x^2 72
 $\downarrow \quad \quad \downarrow$ \downarrow \downarrow
 Factors $(x + 9)(x - 8) = 0$ $x \quad x$ $9 \quad 8$
 $+9x$
 $+9x$

$x+9=0$ $x-8=0$
 $-9 \mid x=-9 \mid -9$ $+8 \mid x=8 \mid +8$

Pg 144 Q2.

$$x^2 - x = 90$$

$$-90 \left| x^2 - x - 90 = 0 \right| -90$$

$$x^2 - x - 90 = 0$$

$$(x - 10)(x + 9) = 0$$

$$\begin{array}{l} x-10=0 \\ +10 \mid x=10 \end{array} \left. \begin{array}{l} x+9=0 \\ +10 \mid x=-9 \end{array} \right\} \begin{array}{l} +9x \\ -10x \\ \hline -1x \end{array}$$

$$\begin{array}{r} x^2 \\ / \quad \backslash \\ x \quad x \end{array} \quad \begin{array}{l} 90 \\ 10 \times 9 \end{array}$$

Test Topics

- Factorize
- Substitution
- b Formula (Quadratic)
- Forming quadratic from roots.

} Revision
Test yourself 8
Pg 148
Q1 → 3.