

Exercise 2.5

1. State (i) the sum and (ii) the product of the roots of each of the following quadratic equations.

(a) $x^2 + 9x + 4 = 0$

(b) $x^2 - 2x - 5 = 0$

	$x^2 - [\text{Sum Roots}]x + [\text{Product}] = 0$	
(a)	Sum Roots = -9	Product = 4
(b)	Sum = 2	Product = -5

1. State (i) the sum and (ii) the product of the roots of each of the following quadratic equations.

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

(d) $x^2 - 9x - 3 = 0$

	$x^2 - [\text{Sum Roots}]x + [\text{Product}] = 0$	
(c)	Sum = +7	Product = 2
(d)	Sum = 9	Product = -3

1. State (i) the sum and (ii) the product of the roots of each of the following quadratic equations.

(e) $2x^2 - 7x + 1 = 0$

(f) $7x^2 + x - 1 = 0$

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

$$\text{Sum of Roots} = \frac{-b}{a}$$

$$\text{product} = \frac{c}{a}$$

$1x^2 - [\text{Sum of Roots}]x + [\text{Product}] = 0$

(e) $2x^2 - 7x + 1 = 0$
 $1x^2 - \frac{7}{2}x + \frac{1}{2} = 0$

Sum = $\frac{7}{2}$ Product = $\frac{1}{2}$

(f) Sum = $-\frac{1}{7}$ Product = $-\frac{1}{7}$

1. State (i) the sum and (ii) the product of the roots of each of the following quadratic equations.

(g) $3x^2 + 10x - 2 = 0$

(h) $5x^2 + 10x + 1 = 0$

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

$$\text{Sum of Roots} = \frac{-b}{a}$$

$$\text{product} = \frac{c}{a}$$

(g) Sum = $-\frac{10}{3}$ Product = $-\frac{2}{3}$

(h) Sum = $-\frac{10}{5} = -2$
 Product = $+\frac{1}{5}$

1. State (i) the sum and (ii) the product of the roots of each of the following quadratic equations.

(i) $3 - 2x - x^2 = 0$

(j) $-5 + 3x - 4x^2 = 0$

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

$$\text{Sum of roots} = \frac{-b}{a}$$

$$\text{Product} = \frac{c}{a}$$

(i) $-x^2 - 2x + 3 = 0$
 $x^2 + 2x - 3 = 0$

Sum = -2

Product = -3

(ii) $-4x^2 + 3x - 5 = 0$
 $4x^2 - 3x + 5 = 0$

Sum = $\frac{3}{4}$

Product = $\frac{5}{4}$

3. Find the quadratic equations that have the following pairs of roots (r_1, r_2) .

(i) $(4, 6)$

(ii) $(2, -3)$

(iii) $(-5, -1)$

(iv) $(\sqrt{5}, 4)$

(i) Roots
 $x = 4, x = 6$

Sum of roots = 10

Product of roots = 24

$$x^2 - [\text{Sum Roots}]x + [\text{Product Roots}] = 0$$

$$x^2 - 10x + 24 = 0$$

(ii) Roots
 $x = 2, x = -3$

Sum roots = -1

Product roots = -6

$$x^2 - [\text{Sum Roots}]x + [\text{Product Roots}] = 0$$

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

(iii) Roots
 $x = -5, x = -1$

Sum roots = -6

Product roots = 5

$$x^2 - [\text{Sum Roots}]x + [\text{Product Roots}] = 0$$

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

(iv) Roots, $x = \sqrt{5}, x = 4$
 Sum = $\sqrt{5} + 4$
 Product = $4\sqrt{5}$

$$x^2 - [\text{Sum Roots}]x + [\text{Product Roots}] = 0$$

$$x^2 - (\sqrt{5} + 4)x + 4\sqrt{5} = 0$$

3. Find the quadratic equations that have the following pairs of roots $\{r_1, r_2\}$

(v) $a, 3a$

(vi) $\frac{2}{5}, \frac{3}{5}$

(vii) $\frac{2}{b}, \frac{3}{b}$

(viii) $\frac{5}{2}, \frac{3}{5}$

Roots:

$$x = a$$

$$x = 3a$$

$$\text{Sum roots} = 4a$$

$$\text{Product roots} = 3a^2$$

$$x^2 - [\text{Sum roots}]x + [\text{Product roots}] = 0$$

$$x^2 - 4ax + 3a^2 = 0$$