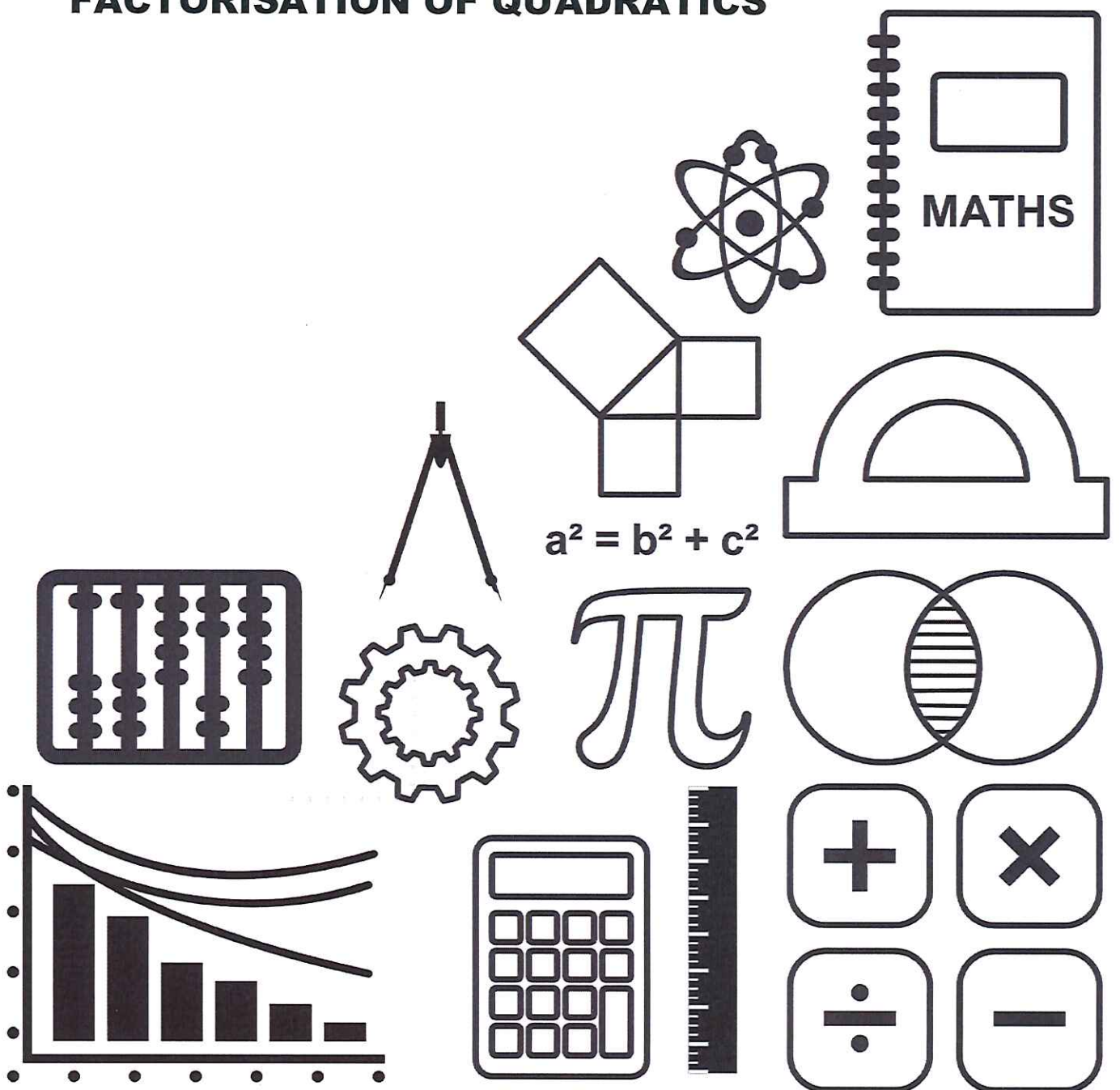


GCSE TOPIC BOOKLET FACTORISATION OF QUADRATICS



1.

(a) Factorise $x^2 - 6x + 8$. = $(x - 4)(x - 2)$ [2]

(b) Factorise $12x^2 - 27y^2$. = $3(4x^2 - 9y^2)$ [3]

↓
difference of 2 squares

= $3(2x + 3y)(2x - 3y)$

2.

Factorise each of the following expressions.

(a) $x^2 + 2x - 8$. = $(x + 4)(x - 2)$

(b) $x^2 - x - 42$. = $(x - 7)(x + 6)$

(c) $15x^2 + 31x + 14$ $a = 15$ $b = 31$ $c = 14$

$xa \quad | \quad +b$
210 | 31 21 and 10

= $15x^2 + 10x + 21x + 14$

= $5x(3x + 2) + 7(3x + 2)$

= $(3x + 2)(5x + 7)$

3.

(a) Factorise the following expressions.

(i) $x^2 - 3x - 10 = (x - 5)(x + 2)$ [2]

(ii) $x^2 - 100$ difference of 2 squares [1]

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

(b) Factorise $x^2 - 5x - 14 = (x - 7)(x + 2)$ [2]

4.

(a) Factorise $6x^2 + 13x - 5$. $a=6$ $b=13$ $c=-5$ [2]

$$\begin{array}{r|l} xax & +b \\ -30 & 13 \end{array} \quad -2 \text{ and } 15$$

$$\begin{aligned} &= 6x^2 - 2x + 15x - 5 \\ &= 2x(3x - 1) + 5(3x - 1) \\ &= (3x - 1)(2x + 5) \end{aligned}$$

(b) Factorise

(i) $9q^2 - 100$, difference of 2 squares

$= (3q + 10)(3q - 10)$ [2]

(ii) $3q^2 + 4q - 20$.

$$\begin{array}{r|l} xax & +b \\ -60 & 4 \end{array} \quad 10 \text{ and } -6$$

$$\begin{aligned} &3q^2 - 6q + 10q - 20 \\ &= 3q(q - 2) + 10(q - 2) \\ &= (q - 2)(3q + 10) \end{aligned} \quad [2]$$

5.

(a) Factorise $16x^2 - 1$. Difference of 2 squares

$$= \underline{(4x+1)(4x-1)}$$

[2]

(b) Factorise $4x^2 - 1600$. $= 4(x^2 - 400)$
↓
difference of 2 squares

$$= \underline{4(x+20)(x-20)}$$

[3]

(c) Factorise

(i) $x^2 - 2x - 15$, $= (x-5)(x+3)$

[2]

(ii) $x^2 + 4x - 21$. $= (x+7)(x-3)$

[2]

6.

Show that the expression $4x^2 - 20x + 25$ can be written in the form $(ax - b)^2$.
 (a) Write down the values of a and b .

$a=4$ $b=-20$ $c=25$

$\begin{array}{c} xac \quad | \quad +b \\ \hline 100 \quad | \quad -20 \end{array}$

-10 and -10

$$= 4x^2 - 10x - 10x + 25$$

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

$$= (2x - 5)(2x - 5) = \underline{(2x - 5)^2}$$

$a=2, b=-5$

[3]

(b) Factorise $x^2 - 16$. difference of 2 squares

$$\underline{(x+4)(x-4)}$$

[1]

(c) Factorise $x^2 - 8x + 15$. $= (x-5)(x-3)$