

Factorising Quadratics (non-monic)

Exam Style Questions

1. Factorise $2x^2 + 6x + 4$

$$= 2(x^2 + 3x + 2)$$

$$= 2(x+2)(x+1)$$

..... $2(x+2)(x+1)$ (2 marks)

2. Factorise $2x^2 - 12x - 14$

$$2(x^2 - 6x - 7)$$

$$2(x-7)(x+1)$$

..... $2(x-7)(x+1)$ (2 marks)

3. Factorise $5x^2 + 10x + 5$

$$= 5(x^2 + 2x + 1)$$

$$= 5(x+1)^2$$

..... $5(x+1)^2$ (2 marks)

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

$2(x+2)(x-2)$ (2 marks)

5. Factorise $4x^2 - 9$
 \rightarrow difference of two squares

$(2x+3)(2x-3)$ (2 marks)

6. Factorise $16x^2 - 25$
 \rightarrow difference of two squares

$(4x+5)(4x-5)$ (2 marks)

7. Factorise $25x^2 - 36y^2$
 \rightarrow difference of two squares

$(5x+6y)(5x-6y)$ (2 marks)

8. Factorise $4x^2 - 81y^2$

$(2x+9y)(2x-9y)$ (2 marks)

9. Factorise $2x^2 + 3x + 1$

$$2x^2 + 2x \mid x + 1$$

$$2x(x+1) + 1(x+1)$$

$$(2x+1)(x+1)$$

$$2 \times 1 = 2$$

$$\underline{2} \times \underline{1} = 2$$

$$\underline{2} + \underline{1} = 3$$

$(2x+1)(x+1)$ (2 marks)

10. Factorise $3x^2 + 7x + 2$

$$3x^2 + 6x \mid x + 2$$

$$3x(x+2) + 1(x+2)$$

$$(3x+1)(x+2)$$

$$3 \times 2 = 6$$

$$\underline{6} \times \underline{1} = 6$$

$$\underline{6} + \underline{1} = 7$$

$(3x+1)(x+2)$ (2 marks)

11. Factorise $2x^2 - 7x + 3$

$$= 2x^2 - 6x \mid x + 3$$

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

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

$$2 \times 3 = 6$$

$$\underline{-6} \times \underline{-1} = 6$$

$$\underline{-6} + \underline{-1} = -7$$

$(2x-1)(x-3)$ (2 marks)

$$\begin{aligned}
 12. \text{ Factorise } & 3x^2 + x - 2 \\
 = & 3x^2 + 3x - 2x - 2 \\
 = & 3x(x+1) - 2(x+1) \\
 = & (3x-2)(x+1)
 \end{aligned}$$

$$\begin{aligned}
 3x-2 &= -6 \\
 \underline{3} \times \underline{-2} &= -6 \\
 \underline{3} + \underline{-2} &= 1
 \end{aligned}$$

$$\dots (3x-2)(x+1) \dots \text{ (2 marks)}$$

$$\begin{aligned}
 13. \text{ Factorise } & 6x^2 + 7x + 2 \\
 = & 6x^2 + 4x + 3x + 2 \\
 = & 2x(3x+2) + 1(3x+2) \\
 = & (2x+1)(3x+2)
 \end{aligned}$$

$$\begin{aligned}
 6 \times 2 &= 12 \\
 \underline{4} \times \underline{3} &= 12 \\
 \underline{4} + \underline{3} &= 7
 \end{aligned}$$

$$\dots (2x+1)(3x+2) \dots \text{ (2 marks)}$$

$$\begin{aligned}
 14. \text{ Factorise } & 8x^2 + 26x - 7 \\
 = & 8x^2 + 28x - 2x - 7 \\
 = & 4x(2x+7) - 1(2x+7) \\
 = & (2x+7)(4x-1)
 \end{aligned}$$

$$\begin{aligned}
 8x-7 &= -56 \\
 \underline{28} \times \underline{-2} &= -56 \\
 \underline{28} + \underline{-2} &= 26
 \end{aligned}$$

$$\dots (2x+7)(4x-1) \dots \text{ (2 marks)}$$

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

$$\begin{aligned}
 6 \times 1 &= 6 \\
 \underline{-3} \times \underline{-2} &= 6 \\
 \underline{-3} + \underline{-2} &= -5
 \end{aligned}$$

$$\dots (2x-1)(3x-1) \dots \text{ (2 marks)}$$
