Name: _____

GCSE (1 – 9)

Factorising Harder Quadratics

Instructions

- Use **black** ink or ball-point pen.
- Answer all questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

Information

- The marks for each question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end

1 Factorise $2x^2 + 5x + 2$

A C

$A \times C = 4$

1×4

2×2

$$\frac{(2x+1)(2x+4)}{2}$$

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

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

(Total for question 1 is 2 marks)

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2 Factorise $2x^2 + 11x + 12$

$A \times C = 24$

1	24
2	12
3	8
4	6

$$\frac{(2x+3)(2x+8)}{2}$$

$$(2x+3)(x+4)$$

$(2x+3)(x+4)$

(Total for question 2 is 2 marks)

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3 Solve $3x^2 + 17x + 10 = 0$

$A \times C = 30$

1	×	30
2		15
3		10
5		6

$$\frac{(3x+2)(3x+15)}{3}$$

$$(3x+2)(x+5) = 0$$

$x = -\frac{2}{3}$ $x = -5$

$x = -\frac{2}{3}$ $x = -5$

(Total for question 3 is 3 marks)

4 Factorise $2x^2 - x - 1$

$AC = 2$

$1 \quad 2$

$\frac{(2x+1)(2x-2)}{2}$

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

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

(Total for question 4 is 2 marks)

5 Factorise $3x^2 - 11x + 6$

$AC = 18$

$1 \quad 18$
$2 \quad 9$
$3 \quad 6$

$\frac{(3x-2)(3x-9)}{3}$

$(3x-2)(x-3)$

$(3x-2)(x-3)$

(Total for question 5 is 2 marks)

6 Solve $4x^2 - 19x - 5 = 0$

$AC = 20$

$1 \quad 20$
$2 \quad 10$
$4 \quad 5$

$\frac{(4x+1)(4x-20)}{4}$

$(4x+1)(x-5) = 0$

$x = -\frac{1}{4} \quad x = 5$

$x = -\frac{1}{4} \quad x = 5$

~~$(4x+1)(x-5)$~~

(Total for question 6 is 3 marks)

7 Factorise $2x^2 + 3x - 9$

AC 18

1 18
2 9
3 6

$\frac{(2x+6)(2x-3)}{2}$

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

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

(Total for question 7 is 2 marks)

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8 Factorise $2x^2 - 9x + 10$

AC 20

1 20
2 10
4 5

$\frac{(2x-4)(2x-5)}{2}$

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

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

(Total for question 8 is 2 marks)

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9 Solve $5x^2 + 11x - 12 = 0$

AC 60

1 60
2 30
3 20
4 15
5 12
6 10

$\frac{(5x+15)(5x-4)}{5}$

$(x+3)(5x-4)$

$x = -3 \quad x = \frac{4}{5}$

$x = -3 \quad x = \frac{4}{5}$

(Total for question 9 is 3 marks)

10 Factorise $3x^2 + 16x + 21$

63

1 63

3 21

7 9

$\frac{(3x+7)(3x+9)}{3}$

$(3x+7)(x+3)$

$(3x+7)(x+3)$

(Total for question 10 is 2 marks)

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11 Factorise $2x^2 - 21x + 54$

108

1 108

2 54

3 36

4 27

6 18

9 12

$\frac{(2x-9)(2x-12)}{2}$

$(2x-9)(x-6)$

$(2x-9)(x-6)$

(Total for question 11 is 2 marks)

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12 Solve $5x^2 - 37x - 24 = 0$

120

1 120

2 60

3 40

4 30

5 24

6 20

8 15

10 12

$\frac{(5x+3)(5x-40)}{5}$

$(5x+3)(x-8)$

$x = -\frac{3}{5}$ $x = 8$

$x = -\frac{3}{5}$ $x = 8$

(Total for question 12 is 3 marks)

13 Factorise $6x^2 + 17x + 12$

$AC = 72$

1	72
2	36
3	24
4	18
6	12
8	9

$$\frac{(6x + 8)(6x + 9)}{6}$$

$$\frac{2(3x + 4)3(2x + 3)}{2 \times 3}$$

$(3x + 4)(2x + 3)$

(Total for question 13 is 2 marks)

14 Factorise $9x^2 - 3x - 20$

180

1	180
2	90
3	60
4	45
5	36
6	30
9	20
10	18
12	15

$$\frac{(9x + 12)(9x - 15)}{9}$$

$(3x + 4)(3x - 5)$

$(3x + 4)(3x - 5)$

(Total for question 14 is 2 marks)

15 Solve $15x^2 - 22x + 8 = 0$

120

1	120
2	60
3	40
4	30
5	24
6	20
8	15
10	12

$$\frac{(15x - 10)(15x - 12)}{15}$$

$(3x - 2)(5x - 4) = 0$

$x = \frac{2}{3}$ $x = \frac{4}{5}$

$x = \frac{2}{3}$ $x = \frac{4}{5}$

(Total for question 15 is 3 marks)

16 Factorise fully $2x^2 - 98$

$2(x^2 - 49)$

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

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

(Total for question 16 is 2 marks)

17 Factorise fully $3x^2 - 12$

$3(x^2 - 4)$

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

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

(Total for question 17 is 2 marks)

18 Solve $5x^2 - 80 = 0$

$5(x^2 - 16) = 0$

$5(x+4)(x-4) = 0$

$x = -4 \quad x = 4$

$x = -4 \quad x = 4$

(Total for question 18 is 3 marks)

19 Factorise $x^2 + 2xy + y^2$

$(x + y)(x + y)$

(Total for question 19 is 2 marks)

20 Factorise $2x^2 + 13xy + 15y^2$

30

1	30
2	15
3	10
5	6

$\frac{(2x + 3y)(2x + 10y)}{2}$

$(2x + 3y)(x + 5y)$

$(2x + 3y)(x + 5y)$

(Total for question 20 is 2 marks)

21 Factorise $3x^2 - 17xy + 20y^2$

60

1	60
2	30
3	20
4	15
5	12
6	10

$\frac{(3x - 5y)(3x - 12y)}{3}$

$(3x - 5y)(x - 4y)$

$(3x - 5y)(x - 4y)$

(Total for question 21 is 2 marks)