

Assessment: Factorisation of Quadratics and Other Expressions KS4 Higher

Time Allowed: 40-50minutes

Non-Calculator

Name: _____

Factorise completely:

Marks

1. $x^2 + 7x$ (1)

2. $7x^2 - 14x$ (1)

3. $7x^2 + 7x$ (1)

4. $x^2 + 7x + 6$ (2)

5. $x^2 - 7x + 6$ (2)

6. $x^2 - 5x - 36$ (2)

7. $2x^2 + 7x - 4$ (2)

8. $5x^2 + 26x + 5$ (2)

9. $3x^2 - 11x + 6$ (2)

10. $6x^2 - 31x + 18$ (2)

$$11. x^2 - 400 \quad (2)$$

$$12. 2x^2 - 200 \quad (3)$$

$$13. 49x^2 - 100 \quad (2)$$

$$14. 144 - 9x^2 \quad (2)$$

$$15. (2n + 1)^2 - n^2 \quad (2)$$

$$16. (n + 1)^2 + n + 1 \quad (2)$$

$$17. (n - 1)^2 + n - 1 \quad (2)$$

$$18. (2n - 1)^2 + (2n - 1) \quad (2)$$

$$19. xy - yw + xp - pw \quad (2)$$

$$20. xw - yw - xp + py \quad (3)$$

$$21. xy + yw + x + w \quad (2)$$

$$22. xy - yw + x - w \quad (2)$$

$$23. n^4 - 625 \quad (3)$$

$$24. 16n^2 - 1024 \quad (3)$$

$$25. 16n^4 - 256 \quad (4)$$

26. Use factorisation to show that:

$$(a) (a + c)^2 - (a - c)^2 = 4ac \quad (3)$$

$$(b)(m - n)^2 - (n + m)^2 = -4mn \quad (4)$$

Solutions and Mark Scheme (adaptable)

Assessment: Factorisation of Quadratics and Other Expressions KS4 Higher

Name: _____

$\frac{60}{60}$

Non-Calculator

Notes

(B1) independent of method.

(Cao)

Correct answer only.

(M) method

(A) accuracy

(CSO) Correct Solution only.

Factorise completely:

1. $x^2 + 7x = x(x+7)$ (B1) Cao

2. $7x^2 - 14x = 7x(x-2)$ (B1) Cao
all correct

3. $7x^2 + 7x = 7x(x+1)$ (B1) Cao
correct (B1) partial

4. $x^2 + 7x + 6 = (x+1)(x+6)$ (B2) 1 for each correct bracket.

5. $x^2 - 7x + 6 = (x-1)(x-6)$ (B2) all correct (B1) if both signs +

6. $x^2 - 5x - 36 = (x-9)(x+4)$ (B2) all correct (B1) signs wrong way round.

7. $2x^2 + 7x - 4 = (2x-1)(x+4)$ (B2) same as Q6.

8. $5x^2 + 26x + 5 = (5x+1)(x+5)$ (B2) (B1) if signs -
↓ one for each bracket.

9. $3x^2 - 11x + 6 = (3x-2)(x-3)$ (B2) (B1) if signs +
(B1) each bracket

10. $6x^2 - 31x + 18 = (3x-2)(2x-9)$ (B2) (B1) for each correct bracket -1 if signs +

11. $x^2 - 400$

$= (x+20)(x-20)$ (B2) cao

12. $2x^2 - 200$

$= 2(x^2 - 100)$ (B1)

$= 2(x+10)(x-10)$ (B2) cao Note $(2x+20)(x-10)$ OR $(x+10)(2x-20)$ Score (B2) only.

13. $49x^2 - 100$

$= (7x+10)(7x-10)$ (B2) cao

14. $144 - 9x^2$

$= (12+3x)(12-3x)$ (B2) cao

15. $(2n+1)^2 - n^2$

$= (2n+1+n)(2n+1-n)$ (M1)

$= (3n+1)(n+1)$ (A1) cao

16. $(n+1)^2 + n + 1$

$= (n+1)(n+1+1)$ (M1)

$= (n+1)(n+2)$ (A1) cao

17. $(n-1)^2 + n - 1$

$= (n-1)(n-1+1)$ (M1)

$= (n-1)(n) = n(n-1)$ (A1) cao

18. $(2n-1)^2 + (2n-1)$

$= (2n-1)(2n-1+1)$ (M1)

$= 2n(2n-1)$ (A1) cao

19. $xy - yw + xp - pw$

$= y(x-w) + p(x-w)$ (M1) any correct bracket

$= (x-w)(y+p)$ (A1) cao

20. $xw - yw - xp + py$

$= w(x-y) - p(x-y)$ (M1) any correct bracket

$= (x-y)(w-p)$ (A2) cao

21. $xy + yw + x + w$

$= y(x+w) + (x+w)$ (M1) any correct bracket

$= (x+w)(y+1)$ (A1) cao

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$$22. xy - yw + x - w$$

$$= y(x-w) + (x-w) \quad (M1) \text{ any correct bracket}$$

$$= (x-w)(y+1) \quad (A1) \text{ cao}$$

$$23. n^4 - 625$$

$$= (n^2+25)(n^2-25) \quad (B2)$$

$$= (n^2+25)(n+5)(n-5) \quad (B1)$$

$$24. 16n^2 - 1024$$

$$= 16(n^2 - 64) \quad (M1) \text{ attempt to factorise with 16}$$

$$= 16(n+8)(n-8) \quad (A2) \text{ cao}$$

$$25. 16n^4 - 256$$

$$= 16(n^4 - 16) \quad (M1) \text{ attempt to factorise}$$

$$= 16(n^2+4)(n^2-4) \quad (A2) \text{ cao}$$

$$= 16(n^2+4)(n+2)(n-2) \quad (A1) \text{ cao}$$

26. Use factorisation to show that:

$$(a) (a+c)^2 - (a-c)^2 = 4ac$$

$$\text{L.H.S} = (a+c) + (a-c) \quad (M1) \text{ any correct bracket}$$

$$= (a+c-a+c)(a+c-a+c) \quad (A1)$$

$$= (2a)(2c)$$

$$= \underline{4ac} = \text{RHS} \quad (A1) \text{ correct solution only (CSO)}$$

$$(b) (m-n)^2 - (n+m)^2 = -4mn$$

$$\text{L.H.S} = (m-n) + (n+m) \quad (M1)$$

$$= (m-n-n-m)(m-n-n-m) \quad (A1) (A1) \text{ each correct bracket}$$

$$= (2m)(-2n)$$

$$= -4mn = \text{RHS} \quad (A1) \text{ CSO}$$

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I hope you find this useful. Feel free to change the mark scheme.

Please check answers and let me know if you find any errors.

The word version is available upon request.