FACTORISING QUADRATICS

Task 1 – Factorise each of the following expressions.

1) $x^2 + 12x + 35 = (x + 5)(x + 7)$

2) $y^2 + 5y + 6 = (y + 2)(y + 3)$

3) $b^2 + 10b + 24 = (b + 4)(b + 6)$

4) $x^2 + 5x + 4 = (x + 4)(x + 1)$

5) $x^2 + 9x + 14 = (x + 2)(x + 7)$

6) $k^2 + 6k - 72 = (k - 6)(k + 12)$

7) $a^2 + a - 72 = (a + 9)(a - 8)$

8) $c^2 - 4c - 21 = (c + 3)(c - 7)$

9) $m^2 - 10m + 24 = (m - 4)(m - 6)$

10) $p^2 - 8p + 15 = (p - 3)(p - 5)$

11) $u^2 + 10u + 25 = (u + 5)(u + 5)$

12) $t^2 - 2t - 8 = (t - 4)(t + 2)$

13) $f^2 + 12f + 27 = (f + 3)(f + 9)$

14) $y^2 + 2y - 24 = (y + 6)(y - 4)$

15) $e^2 - 4e + 4 = (e - 2)(e - 2)$

16) $b^2 - 9b - 70 = (b + 5)(b - 14)$

17) $w^2 + 22w + 120 = (w + 10)(w + 12)$

18) $q^2 - 20q + 96 = (q - 12)(q - 8)$

19) $x^2 - 40x + 400 = (x - 20)(x - 20)$

20) $r^2 - r - 156 = (r + 12)(r - 13)$

21) $z^2 - 23z + 132 = (z - 12)(z - 11)$

22) $e^2 - e - 110 = (e - 11)(e + 10)$

23) $i^2 + 30i + 224 = (i + 14)(i + 16)$

24) $n^2 + 28n + 180 = (n + 18)(n + 10)$

25) $g^2 + 5g - 500 = (g + 25)(g - 20)$

26) $f^2 - 10f - 1200 = (f - 40)(f + 30)$

Task 2 – Factorise each of the following expressions.

27) $2x^2 + 7x + 3 = (2x + 1)(x + 3)$

28) $3x^2 + 11x + 10 = (3x + 5)(x + 2)$

29) $4s^2 + 5s + 1 = (4s + 1)(s + 1)$

30) $2d^2 + 3d + 1 = (2d + 1)(d + 1)$

31) $3y^2 + 26y + 16 = (3y + 2)(y + 8)$

32) $2g^2 + 15g + 18 = (2g + 3)(g + 6)$

33) $4e^2 + 9e + 5 = (4e + 5)(e + 1)$

34) $3z^2 + 17z + 10 = (3z + 2)(z + 5)$

35) $4w^2 - 4w + 1 = (2w - 1)(2w - 1)$

36) $8c^2 - 23c - 36 = (8c + 9)(c - 4)$

37) $9w^2 - 25w - 6 = (9w + 2)(w - 3)$

38) $12x^2 + 7x - 10 = (4x + 5)(3x - 2)$

39) $12r^2 + 5r - 2 = (4r - 1)(3r + 2)$

40) $4x^2 + 8x - 5 = (2x + 5)(2x - 1)$

41) $12x^2 - 19x + 4 = (3x - 4)(4x - 1)$

42) $2y^2 + y - 28 = (2y - 7)(y + 4)$

43) $4a^2 + 5a - 6 = (4a - 3)(a + 2)$

44) $6b^2 - 7b - 24 = (2b + 3)(3b - 8)$

45) $6v^2 - 23v + 7 = (3v - 1)(2v - 7)$

46) $10x^2 - 31x + 15 = (2x - 5)(5x - 3)$

47) $12r^2 - 7r - 5 = (12r + 5)(r - 1)$

48) $7a^2 - 26a + 15 = (7a - 5)(a - 3)$

49) $42e^2 + 29e - 5 = (7e - 1)(6e + 5)$

50) $27a^2 - 30a + 8 = (9a - 4)(3a - 2)$

51) $30k^2 - 27k - 3 = (10k + 1)(3k - 3)$

Challenge

52) **The area of a rectangle is given by the algebraic expression** $x^2 + 5x + 6$ **. Given that the length is equal to** $x + 3$ **units, write an algebraic expression for its width.**

$$\boldsymbol{x + 2}$$

53) **Factorise** $156k^2 + 149k + 35$

$= (\boldsymbol{12k + 5})(\boldsymbol{13k + 7})$

54) **Factorise** $b^4 + 2b^2c^4 + c^8$

$= (\boldsymbol{b^2 + c^4})(\boldsymbol{b^2 + c^4})$

55) **Factorise** $4x^4 + 4x^2y + y^2$

$= (\boldsymbol{2x^2 + y})(\boldsymbol{2x^2 + y})$

56) **Factorise** $m^2n^2 + 2mn + 1$

$= (\boldsymbol{mn + 1})(\boldsymbol{mn + 1})$

57) **Factorise** $6a^4b^4 + 5a^2b^2 + 1$

$= (\boldsymbol{2a^2b^2 + 1})(\boldsymbol{3a^2b^2 + 1})$

58) **Fully factorise** $x^3 + 9x^2 + 20x$

$= x(x^2 + 9x + 20)$

$= \boldsymbol{x(x + 4)(x + 5)}$