

# Factorising Quadratic Expressions

## - Answers

### Exercise A

- ①  $x^2 + 7x + 10 = (x+5)(x+2)$
- ②  $x^2 + 7x + 12 = (x+4)(x+3)$
- ③  $x^2 + 8x + 15 = (x+3)(x+5)$
- ④  $x^2 + 10x + 21 = (x+7)(x+3)$
- ⑤  $x^2 + 8x + 12 = (x+6)(x+2)$
- ⑥  $y^2 + 12y + 35 = (y+7)(y+5)$
- ⑦  $y^2 + 11y + 24 = (y+8)(y+3)$
- ⑧  $y^2 + 10y + 25 = (y+5)^2$
- ⑨  $y^2 + 15y + 36 = (y+12)(y+3)$
- ⑩  $a^2 - 3a - 10 = (a-5)(a+2)$
- ⑪  $a^2 - a - 12 = (a-4)(a+3)$
- ⑫  $z^2 + z - 6 = (z+3)(z-2)$
- ⑬  $x^2 - 2x - 35 = (x-7)(x+5)$
- ⑭  $x^2 - 5x - 24 = (x-8)(x+3)$
- ⑮  $x^2 - 6x + 8 = (x-4)(x-2)$
- ⑯  $y^2 - 5y + 6 = (y-3)(y-2)$
- ⑰  $x^2 - 8x + 15 = (x-5)(x-3)$
- ⑱  $a^2 - a - 6 = (a-3)(a+2)$
- ⑲  $a^2 + 14a + 45 = (a+9)(a+5)$
- ⑳  $b^2 - 4b - 21 = (b-7)(b+3)$
- ㉑  $x^2 - 8x + 16 = (x-4)(x-4)$
- ㉒  $y^2 + 2y + 1 = (y+1)(y+1)$
- ㉓  $y^2 - 3y - 28 = (y-7)(y+4)$

$$(24) \quad x^2 - x - 20 = (x-5)(x+4)$$

$$(25) \quad x^2 - 8x - 240 = (x-20)(x+12)$$

$$(26) \quad x^2 - 26x + 165 = (x-15)(x-11)$$

$$(27) \quad y^2 + 3y - 108 = (y+12)(y-9)$$

$$(28) \quad x^2 - 49 = (x-7)(x+7)$$

$$(29) \quad x^2 - 9 = (x-3)(x+3)$$

$$(30) \quad x^2 - 16 = (x-4)(x+4)$$

$$(31) \quad 2x^2 + 12x + 16 = 2 [x^2 + 6x + 8]$$

$$= 2 [(x+4)(x+2)]$$

$$= 2 \underline{(x+4)(x+2)}$$

(32)

$$(a) \quad 2x^2 + 4x - 30 = 2 [x^2 + 2x - 15]$$

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

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

$$(b) \quad 3x^2 + 21x + 30 = 3 [x^2 + 7x + 10]$$

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

$$(c) \quad 3x^2 + 24x + 45 = 3(x^2 + 8x + 15)$$

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

$$(d) \quad 2n^2 - 6n - 20 = 2(n^2 - 3n - 10)$$

$$= 2(n-5)(n+2)$$

$$(e) \quad 5a^2 + 5a - 30 = 5(a^2 + \overset{a}{\cancel{a}} - 6)$$

$$= 5(a+3)(a-2)$$

$$(f) \quad 4x^2 - 64 = 4(x^2 - 16)$$

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

Exercise B

$10. \quad 2x^2 + 5x + 3$ $= 2x^2 + 3x + 2x + 3$ $= x(2x+3) + 1(2x+3)$ $= \underline{\underline{(2x+3)(x+1)}}$	$p = (+2)(+3) = +6$ $s = +5$ $\underbrace{\quad\quad}_{+3, +2}$
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$2. \quad 2x^2 + 7x + 3$ $= 2x^2 + 6x + x + 3$ $= 2x(x+3) + 1(x+3)$ $= \underline{\underline{(x+3)(2x+1)}}$	$p = (+2)(+3) = +6$ $s = +7$ $\left. \begin{array}{l} +6 \\ +1 \end{array} \right\}$
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$3. \quad 3x^2 + 7x + 2$ $= 3x^2 + 6x + x + 2$ $= 3x(x+2) + 1(x+2)$ $= \underline{\underline{(x+2)(3x+1)}}$	$p = (+3)(+2) = +6$ $s = +7$ $\left. \begin{array}{l} +6 \\ +1 \end{array} \right\}$
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$$\begin{aligned}
4. \quad & 2x^2 + 11x + 12 \\
& = 2x^2 + 8x + 3x + 12 \\
& = 2x(x+4) + 3(x+4) \\
& = \underline{\underline{(x+4)(2x+3)}}
\end{aligned}$$

$$\begin{aligned}
p &= (+2)(+12) = +24 \\
s &= +11
\end{aligned}
\left. \begin{array}{l} \\ \\ \end{array} \right\} \begin{array}{l} +8, \\ +3 \end{array}$$

$$\begin{aligned}
5. \quad & 3x^2 + 8x + 4 \\
& = 3x^2 + 6x + 2x + 4 \\
& = 3x(x+2) + 2(x+2) \\
& = \underline{\underline{(x+2)(3x+2)}}
\end{aligned}$$

$$\begin{aligned}
p &= (+3)(+4) = +12 \\
s &= +8
\end{aligned}
\left. \begin{array}{l} \\ \\ \end{array} \right\} \begin{array}{l} +6, \\ +2 \end{array}$$

$$\begin{aligned}
6. \quad & 2x^2 + 7x + 5 \\
& = 2x^2 + 5x + 2x + 5 \\
& = x(2x+5) + 1(2x+5) \\
& = \underline{\underline{(2x+5)(x+1)}}
\end{aligned}$$

$$\begin{aligned}
p &= (+2)(+5) = +10 \\
s &= +7
\end{aligned}
\left. \begin{array}{l} \\ \\ \end{array} \right\} \begin{array}{l} +5, \\ +2 \end{array}$$

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

$$\begin{aligned}
p &= (+3)(-2) = -6 \\
s &= -5
\end{aligned}
\left. \begin{array}{l} \\ \\ \end{array} \right\} \begin{array}{l} -6, +1 \end{array}$$

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

$$\begin{aligned}
p &= (+2)(-15) = -30 \\
s &= -1
\end{aligned}
\left. \begin{array}{l} \\ \\ \end{array} \right\} \begin{array}{l} -6, \\ +5 \end{array}$$

$$\begin{aligned}
 9. \quad & 2x^2 + x - 21 \\
 & = 2x^2 + 7x - 6x - 21 \\
 & = x(2x+7) - 3(2x+7) \\
 & = \underline{\underline{(2x+7)(x-3)}}
 \end{aligned}$$

$$\begin{aligned}
 p &= (+2)(-21) = -42 \\
 s &= +1 \\
 & \quad \underbrace{\phantom{+1}} \\
 & \quad +7, -6
 \end{aligned}$$

$$\begin{aligned}
 10. \quad & 3x^2 - 17x - 28 \\
 & = 3x^2 - 21x + 4x - 28 \\
 & = 3x(x-7) + 4(x-7) \\
 & = \underline{\underline{(x-7)(3x+4)}}
 \end{aligned}$$

$$\begin{aligned}
 p &= (+3)(-28) = -84 \\
 s &= -17 \\
 & \quad \underbrace{\phantom{-17}} \\
 & \quad -21, +4
 \end{aligned}$$

$$\begin{aligned}
 11. \quad & 6x^2 + 7x + 2 \\
 & = 6x^2 + 4x + 3x + 2 \\
 & = 2x(3x+2) + 1(3x+2) \\
 & = \underline{\underline{(3x+2)(2x+1)}}
 \end{aligned}$$

$$\begin{aligned}
 p &= (+6)(+2) = +12 \\
 s &= +7 \\
 & \quad \underbrace{\phantom{+7}} \\
 & \quad +4, +3
 \end{aligned}$$

$$\begin{aligned}
 12. \quad & 3x^2 - 11x + 6 \\
 & = 3x^2 - 9x - 2x + 6 \\
 & = 3x(x-3) - 2(x-3) \\
 & = \underline{\underline{(x-3)(3x-2)}}
 \end{aligned}$$

$$\begin{aligned}
 p &= (+3)(+6) = +18 \\
 s &= -11 \\
 & \quad \underbrace{\phantom{-11}} \\
 & \quad -9, -2
 \end{aligned}$$

$$\begin{aligned}
 13. \quad & 3y^2 - 11y + 10 \\
 & = 3y^2 - 6y - 5y + 10 \\
 & = 3y(y-2) - 5(y-2) \\
 & = \underline{\underline{(y-2)(3y-5)}}
 \end{aligned}$$

$$\begin{aligned}
 p &= (+3)(+10) = +30 \\
 s &= -11 \\
 & \quad \underbrace{\phantom{-11}} \\
 & \quad -6, -5
 \end{aligned}$$

$$\begin{aligned}
 14. \quad & 6y^2 + 7y - 3 \\
 & = 6y^2 + 9y - 2y - 3 \\
 & = 3y(2y + 3) - 1(2y + 3) \\
 & = \underline{\underline{(2y + 3)(3y - 1)}}
 \end{aligned}$$

$$\begin{aligned}
 p & = (+6)(-3) = -18 \\
 s & = +7 \\
 & \quad \underbrace{\hspace{1.5cm}} \\
 & \quad \quad +9, -2
 \end{aligned}$$

$$\begin{aligned}
 15. \quad & 10x^2 + 9x + 2 \\
 & = 10x^2 + 5x + 4x + 2 \\
 & = 5x(2x + 1) + 2(2x + 1) \\
 & = \underline{\underline{(2x + 1)(5x + 2)}}
 \end{aligned}$$

$$\begin{aligned}
 p & = (+10)(+2) = +20 \\
 s & = +9 \\
 & \quad \underbrace{\hspace{1.5cm}} \\
 & \quad \quad +5, +4
 \end{aligned}$$