Solutions

2.1

- collect the a-terms and the b-terms: $5a - 2a = 3a$ and $3b + b = 4b$
- $\boldsymbol{3a + 4b}$

2.2

- numbers: $3 \times 4 = 12$; letters: $a \times a \times b = a^2b$, so $\boldsymbol{12a^2b}$

2.3

- $3x + 12 - 2x + 2$: the -2 multiplies -1 to give $+2$
- $\boldsymbol{x + 14}$

2.4

- HCF of $8x^2$ and $12x$ is $4x$
- $\boldsymbol{4x(2x - 3)}$

2.5

- $x^2 - 2x + 5x - 10$
- $\boldsymbol{x^2 + 3x - 10}$

2.6

(a) $3 \times 4 = 12$ and $3 + 4 = 7$: $\boldsymbol{(x + 3)(x + 4)}$

(b) difference of two squares, $49 = 7^2$: $\boldsymbol{(y - 7)(y + 7)}$

3.1

- **No**: x^2 and x are unlike terms, so they cannot be collected; for example at $x = 2$, $x^2 + x = 6$ but $x^3 = 8$

3.2

- $(2x - 3)(2x - 3) = 4x^2 - 6x - 6x + 9$
- $\boldsymbol{4x^2 - 12x + 9}$

3.3

- rectangle: $(x + 6)(x - 1) = x^2 - x + 6x - 6 = x^2 + 5x - 6$
- square: x^2
- difference: $(x^2 + 5x - 6) - x^2 = 5x - 6$

3.4

- $a \times c = 3 \times (-8) = -24$; two numbers multiplying to -24 and adding to 10: 12 and -2
- $3x^2 + 12x - 2x - 8 = 3x(x + 4) - 2(x + 4) = \boldsymbol{(3x - 2)(x + 4)}$

3.5

- top: $x^2 - 9 = (x - 3)(x + 3)$
- bottom: $x^2 + x - 6 = (x + 3)(x - 2)$
- cancel the common factor $(x + 3)$: $\boldsymbol{\dfrac{x - 3}{x - 2}}$