

### Questions

1. Combine like terms  $3x + 2y - 8x - 7y$ .
2. Combine like terms  $2x^2 - 3x - 5 - 7x + 8 - x^2$ .
3. Combine like terms  $\frac{1}{3}x - \frac{2}{3}y - \frac{2}{5}x + \frac{4}{7}y$ .
4. Combine like terms  $\frac{3}{4}a^2 - \frac{1}{3}b - \frac{1}{5}a^2 - \frac{1}{2}b$ .
5. Combine like terms  $ab - 7a - 9ab + 4a - 6b$ .
6. Simplify  $-3b(5a - 3b) + 4(-3ab - 5b^2)$ .
7. Simplify  $4(2 - x) - 3(-5 - 12x)$ .

### Solutions

1. Underline the like terms using a different style for each. Remember to include the sign!

$$\underline{3x+2y-8x-7y} = -5x - 5y$$

If you need to include extra steps to see the simplification do so:

$$\begin{aligned} \underline{3x+2y-8x-7y} &= \underline{3x-8x+2y-7y} \text{ rearrange so like terms are together} \\ &= (3-8)x + (+2-7)y \text{ use distributive property "in reverse"} \\ &= -5x - 5y \text{ simplify} \end{aligned}$$

- 2.

$$\begin{aligned} \underline{2x^2-3x-5-7x+8-x^2} &= \underline{2x^2-x^2-3x-7x-5+8} \\ &= (2-1)x^2 + (-3-7)x + (-5+8) \\ &= (1)x^2 + (-10)x + (+3) \\ &= x^2 - 10x + 3 \end{aligned}$$

3. Combine like terms  $\frac{1}{3}x - \frac{2}{3}y - \frac{2}{5}x + \frac{4}{7}y$ .

$$\begin{aligned} \underline{\frac{1}{3}x - \frac{2}{3}y - \frac{2}{5}x + \frac{4}{7}y} &= \underline{\frac{1}{3}x - \frac{2}{5}x - \frac{2}{3}y + \frac{4}{7}y} \\ &= \left(\frac{1}{3} - \frac{2}{5}\right)x + \left(-\frac{2}{3} + \frac{4}{7}\right)y \\ &= \left(\frac{1 \times 5}{3 \times 5} - \frac{2 \times 3}{5 \times 3}\right)x + \left(\frac{-2 \times 7}{3 \times 7} + \frac{4 \times 3}{7 \times 3}\right)y \\ &= \left(\frac{5}{15} - \frac{6}{15}\right)x + \left(\frac{-14}{21} + \frac{12}{21}\right)y \\ &= \left(\frac{5-6}{15}\right)x + \left(\frac{-14+12}{21}\right)y \\ &= \left(\frac{-1}{15}\right)x + \left(\frac{-2}{21}\right)y \\ &= -\frac{1}{15}x - \frac{2}{21}y \end{aligned}$$

4. Combine like terms  $\frac{3}{4}a^2 - \frac{1}{3}b - \frac{1}{5}a^2 - \frac{1}{2}b$ .

$$\begin{aligned} \frac{3}{4}a^2 - \frac{1}{3}b - \frac{1}{5}a^2 - \frac{1}{2}b &= \frac{3}{4}a^2 - \frac{1}{5}a^2 - \frac{1}{3}b - \frac{1}{2}b \\ &= \left(\frac{3}{4} - \frac{1}{5}\right)a^2 + \left(-\frac{1}{3} - \frac{1}{2}\right)b \\ &= \left(\frac{3 \times 5}{4 \times 5} - \frac{1 \times 4}{5 \times 4}\right)a^2 + \left(\frac{-1 \times 2}{3 \times 2} + \frac{-1 \times 3}{2 \times 3}\right)b \\ &= \left(\frac{15}{20} - \frac{4}{20}\right)a^2 + \left(\frac{-2}{6} + \frac{-3}{6}\right)b \\ &= \left(\frac{15-4}{20}\right)a^2 + \left(\frac{-2-3}{6}\right)b \\ &= \left(\frac{11}{20}\right)a^2 + \left(\frac{-5}{6}\right)b \\ &= \frac{11}{20}a^2 - \frac{5}{6}b \end{aligned}$$

5. The underlining is not required if you can do the arithmetic in your head (but make sure you get the arithmetic done correctly!)

$$ab - 7a - 9ab + 4a - 6b = -8ab - 3a - 6b$$

6.

$$\begin{aligned} -3b(5a - 3b) + 4(-3ab - 5b^2) &= (-3b)(5a) - (-3b)(3b) + (4)(-3ab) - (4)(5b^2) \text{ distribute} \\ &= -15ab + 9b^2 - 12ab - 20b^2 \text{ simplify} \\ &= (-15 - 12)ab + (9 - 20)b^2 \text{ collect like terms} \\ &= -27ab - 11b^2 \text{ simplify} \end{aligned}$$

7.

$$\begin{aligned} 4(2 - x) - 3(-5 - 12x) &= (4)(2) - (4)(x) + (-3)(-5) - (-3)(12x) \\ &= 8 - 4x + 15 + 36x \\ &= (8 + 15) + (-4x + 36x) \\ &= 23 + (-4 + 36)x \\ &= 23 + 32x \end{aligned}$$