

Questions

1. Combine like terms $\frac{1}{3}x - \frac{2}{3}y - \frac{2}{5}x + \frac{4}{7}y$.
2. Combine like terms $\frac{3}{4}a^2 - \frac{1}{3}b - \frac{1}{5}a^2 - \frac{1}{2}b$.
3. Combine like terms $ab - 7a - 9ab + 4a - 6b$.
4. Simplify $-3b(5a - 3b) + 4(-3ab - 5b^2)$.
5. Simplify $4(2 - x) - 3(-5 - 12x)$.
6. Evaluate $3x^2 - 5x$ when $x = -3$.
7. Evaluate $x^2 - 7x + 3$ when $x = 3$.
8. Evaluate $\frac{a^2 + ab}{3b}$ when $a = -1$ and $b = -2$.
9. Simplify $2\{3x^2 + 4[2x - (3 - x)]\}$.
10. Simplify $-4\{3a^2 - 2[4a^2 - (b + a^2)]\}$.
11. Simplify $-2\{x^2 - 3[x - (x - 2x^2)]\}$.

Solutions

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

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

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

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

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

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

4.

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

5.

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

6. Write the equation using brackets where there are x s:

$$\begin{aligned} \text{value} &= 3(\quad)^2 - 5(\quad) \\ &= 3(-3)^2 - 5(-3) \text{ put } -3 \text{ in the brackets} \\ &= 3(9) + 15 \text{ simplify} \\ &= 27 + 15 = 42 \end{aligned}$$

7. Evaluate $x^2 - 7x + 3$ when $x = 3$.

$$\begin{aligned} \text{value} &= (\quad)^2 - 7(\quad) + 3 \\ &= (3)^2 - 7(3) + 3 \\ &= 9 - 21 + 3 = -9 \end{aligned}$$

8. If you have trouble doing two variables, do it in two steps.

$$\begin{aligned}
 \text{value} &= \frac{(\quad)^2 + (\quad)b}{3b} \text{ do } a \text{ first} \\
 &= \frac{(-1)^2 + (-1)b}{3b} \text{ put in } a = -1 \\
 &= \frac{1 - b}{3b} \text{ simplify} \\
 &= \frac{1 - (\quad)}{3(\quad)} \text{ now do } b \\
 &= \frac{1 - (-2)}{3(-2)} \text{ put in } b = -2 \\
 &= -\frac{3}{3(2)} \text{ simplify} \\
 &= -\frac{\cancel{3}}{\cancel{3}(2)} \text{ simplify} \\
 &= -\frac{1}{2}
 \end{aligned}$$

9.

$$\begin{aligned}
 2\{3x^2 + 4[2x - (3 - x)]\} &= 6x^2 + 8[2x - (3 - x)] \text{ distribute the } 2 \\
 &= 6x^2 + 16x - 8(3 - x) \text{ distribute the } 8 \\
 &= 6x^2 + 16x - 24 + 8x \text{ distribute the } -8 \\
 &= 6x^2 + 24x - 24 \text{ simplify}
 \end{aligned}$$

10.

$$\begin{aligned}
 -4\{3a^2 - 2[4a^2 - (b + a^2)]\} &= -12a^2 + 8[4a^2 - (b + a^2)] \text{ distribute the } -4 \\
 &= -12a^2 + 32a^2 - 8(b + a^2) \text{ distribute the } 8 \\
 &= -12a^2 + 32a^2 - 8b - 8a^2 \text{ distribute the } -8 \\
 &= 12a^2 - 8b \text{ simplify}
 \end{aligned}$$

11.

$$\begin{aligned}
 -2\{x^2 - 3[x - (x - 2x^2)]\} &= -2x^2 + 6[x - (x - 2x^2)] \text{ distribute the } -2 \\
 &= -2x^2 + 6x - 6(x - 2x^2) \text{ distribute the } 6 \\
 &= -2x^2 + 6x - 6x + 12x^2 \text{ distribute the } -6 \\
 &= 10x^2 \text{ simplify}
 \end{aligned}$$