



Unit 1: Evaluating algebraic expressions
Lesson 04 Combining like terms

Example 1: Evaluate $x + y - 2$ if $x = 3$ and $y = 11$.

$$\begin{aligned} x + y - 2 &= 3 + 11 - 2 \\ &= 14 - 2 = \boxed{12} \end{aligned}$$

Example 2: Evaluate $\frac{abc}{a-c}$ if $a = -10$, $b = 2$, and $c = 5$.

$$\begin{aligned} \frac{abc}{a-c} &= \frac{-10 \cdot 2 \cdot 5}{-10 - 5} = \frac{-100}{-15} \\ &= \frac{100}{15} = \boxed{\frac{20}{3}} \end{aligned}$$

Example 3: Evaluate $|z - x/2 + y|$ if $x = 6$, $y = 10$, $z = 15$.

$$\begin{aligned} \left| z - \frac{x}{2} + y \right| &= \left| 15 - \frac{6}{2} + 10 \right| \\ &= \left| 15 - 3 + 10 \right| = \left| 12 + 10 \right| = \left| 22 \right| \\ &= \boxed{22} \end{aligned}$$

Like terms are those that contain exactly the same variables and with corresponding variables having the **same** exponent.

Example 4: (like terms)

$$\begin{array}{cc} 3x, -7x & 5ax^2, 12ax^2 \\ \text{like} & \text{like} \end{array}$$

Example 5: (unlike terms)

$$4x, 4y$$

unlike

$$8z^2, -3z^3$$

unlike

Simplify algebraic expressions by adding or subtracting the coefficients of **like terms** according to the rules of addition and subtraction given in Lesson 3.

Example 6: Simplify $4x - 3z - 8x + 12z$

$$4x - 3z - 8x + 12z = -4x + 9z$$

Example 7: Simplify $3a^2 - 5a + 6a^2 + a - 2a$

$$3a^2 - 5a + 6a^2 + a - 2a = 9a^2 - 4a - 2a = 9a^2 - 6a$$

Example 8: Combine like terms and then evaluate $6ap - 11q + 4q - 3ap$ at $a = 1$, $p = 2$ and $q = 15$.

$$6ap - 11q + 4q - 3ap = 3ap - 7q$$

$$= 3 \cdot 1 \cdot 2 - 7 \cdot 15$$

$$= 6 - 105 = -99$$

Assignment:

1. Evaluate $x - y - z$ if $x = 8$, $y = 3$, and $z = 1$.

2. Evaluate $3x/y$ at $x = 12$ and $y = 2$.

3. Evaluate $|-4a - 2b|$ where $a = 10$ and $b = -8$.

4. Evaluate $\frac{4x + y - z}{x}$ where $x = 7$, $y = 2$, and $z = 1$.

5. Simplify $8m - 6 + 9m + 5 + m$

6. Simplify $a + 2b - 22a + 17b - 1$

7. Simplify $6x - 2y + z - 3z + x + 13y$

8. Simplify $5z^2 - 6y^3 + 20z^2 + y^3 + 14$

9. Simplify $|-5|(x - 5x) + 2x$

10. Evaluate $-2(x - m)(x + m)$ if $x = 8$ and $m = 9$.

11. Simplify $-5x + 2y + 4 + 6x - y + 11$ and then evaluate at $x = 4$ and $y = -9$.

*12. Combine like terms in $3^2z + 2^3 + 7z - |18a|$ and then evaluate at $a = -2$ and $z = -1$.

*13. Simplify $26xz^2 - 22x^2z + 4xz^2 + 3x^2z$

14. Evaluate $|1 - x/3 + j|$ if $x = 12$ and $j = 2$.