Unit 1: Lesson 04

Evaluating algebraic expressions
Combining like terms

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

$$x+y-2 = 3+11-2$$
$$= 14-2 = \boxed{12}$$

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

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

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

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

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

Example 4: (like terms)

$3x, -7x$ like

$5ax^2, 12ax^2$ like

Example 5: (unlike terms)

$4x, 4y$ unlike $\qquad 8z^2, -3z^3$ 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 $4x - 3z - 8x + 12z$

$4x - 3z - 8x + 12z = \boxed{-4x + 9z}$

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

$3a^2 - 5a + 6a^2 + a - 2a$

$= 9a^2 - 4a - 2a = \boxed{9a^2 - 6a}$

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

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

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

$= 6 - 105 = \boxed{-99}$

Assignment:

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

$x - y - z = 8 - 3 - 1$

$= 5 - 1$

$= \boxed{4}$

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

$\frac{3x}{y} = \frac{3 \cdot 12}{2}$

$= \frac{36}{2} = \boxed{18}$

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

$|-4a - 2b| = |-4 \cdot 10 - 2(-8)|$

$= |-40 + 16|$

$= |-24|$

$= \boxed{24}$

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

$\frac{4x + y - z}{x} = \frac{4 \cdot 7 + 2 - 1}{7}$

$= \frac{28 + 2 - 1}{7}$

$= \frac{30 - 1}{7}$

$= \boxed{\frac{29}{7}}$

5. Simplify 8m – 6 + 9m + 5 + m

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

$= 17m - 1 + m$

$= \boxed{18m - 1}$

6. Simplify a + 2b – 22a + 17b – 1

$a + 2b - 22a + 17b - 1$

$= \boxed{-21a + 19b - 1}$

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

$6x - 2y + z - 3z + x + 13y$

$= \boxed{7x + 11y - 2z}$

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

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

$= \boxed{25z^2 - 5y^3 + 14}$

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

$|-5|(x - 5x) + 2x$

$= 5(-4x) + 2x = -20x + 2x$

$= \boxed{-18x}$

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

$-2(x - m)(x + m)$

$= -2(8 - 9)(8 + 9) = -2(-1)(17)$

$= 2(17) = \boxed{34}$

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

$-5x + 2y + 4 + 6x - y + 11$

$= x + y + 15$

$= 4 + (-9) + 15 = -5 + 15$

$= \boxed{10}$

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

$3^2z + 2^3 + 7z - |18a|$

$= 9z + 8 + 7z - |18a|$

$= 16z + 8 - |18a| = 16 \cdot (-1) + 8 - |18(-2)|$

$= -16 + 8 - |-36| = -8 - 36 = \boxed{-44}$

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

$26xz^2 - 22x^2z + 4xz^2 + 3x^2z$

$= \boxed{30xz^2 - 19x^2z}$

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

$= \left|1 - \frac{12}{3} + 2\right| = |1 - 4 + 2|$

$= |-3 + 2| = |-1|$

$= \boxed{1}$