

1.7 Evaluating and Rewriting Expressions

1. Evaluate an expression.
2. Determine all values that cause an expression to be undefined.
3. Rewrite an expression using the distributive property.
4. Rewrite an expression by combining like terms.

Evaluate Expressions

Evaluate = find the value

1. Replace the variables with their corresponding given values.
2. Calculate the numerical expression using the **order of operations.**

Evaluate Expressions

PEMDAS

$$4a^3 - 2b \text{ when } a = 2, b = -3$$

$$4(\mathbf{2})^3 - 2(\mathbf{-3})$$

$$4(8) - 2(-3)$$

$$32 + (+6)$$

$$38$$

Put parentheses where variable are.
Then substitute values.
Follow order of operations.

Evaluate Expressions

PEMDAS

$$2x^3 - 4y^2 \text{ when } x = -2, y = -3$$

$$2(-2)^3 - 4(-3)^2$$

$$2(-8) - 4(9)$$

$$-16 - 36$$

$$-52$$

Evaluate Expressions



$$2x - 7(y + 1) \text{ when } x = 4, y = -3$$

$$2(\mathbf{4}) - 7([\mathbf{-3}] + 1)$$

$$2(4) - 7(-2)$$

$$8 + (+14)$$

$$22$$



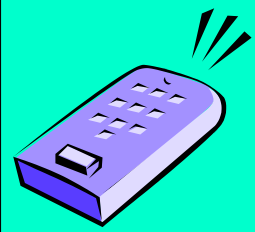
Evaluate the expression $4(a + b)$ when $a = 3$ and $b = -2$.

a) 4

b) -4

c) 12

d) 20



Evaluate the expression $4(a + b)$ when $a = 3$ and $b = -2$.

a) 4

b) -4

c) 12

d) 20

Undefined Expressions

A division expression is undefined when the **denominator** equals 0.

It's okay for the numerator to equal 0.

$\frac{4}{0}$ is undefined.

$$\frac{0}{6} = 0$$

Undefined Expressions

Determine all values that cause the expression to be undefined.

$$\frac{8}{x + 4}$$

$$x = -4$$

$$\frac{8}{-4 + 4} = \frac{8}{0}$$

The expression is undefined when $x = -4$.

Undefined Expressions

Determine all values that cause the expression to be undefined.

$$\frac{m - 3}{m - 7}$$

$$m = 7$$

$$\frac{7 - 3}{7 - 7} = \frac{4}{0}$$

$$m = 3$$

OK!!

$$\frac{3 - 3}{3 - 7} = \frac{0}{-4} = 0$$

The expression is undefined when $m = 7$.

Undefined Expressions

Determine all values that cause the expression to be undefined.

$$\frac{7}{(m - 5)(m + 3)}$$

$$m = 5$$

$$\frac{7}{(5 - 5)(5 + 3)} = \frac{7}{(0)(8)} = \frac{7}{0}$$

The expression is undefined when $m = 5$ or -3 .

$$m = -3$$

$$\frac{7}{(-3 - 5)(-3 + 3)} = \frac{7}{(-8)(0)} = \frac{7}{0}$$



For which values is the expression undefined?

$$\frac{8m}{(m+2)(m-5)}$$

- a) 8
- b) -2
- c) -2 and 5
- d) 2 and -5



For which values is the expression undefined?

$$\frac{8m}{(m+2)(m-5)}$$

a) 8

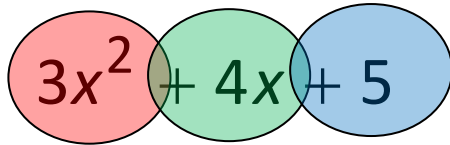
b) -2

c) -2 and 5

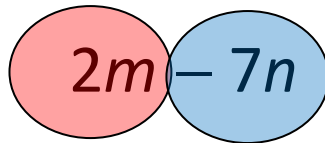
d) 2 and -5

Combining like terms

Terms: The addends in an expression that is a sum.



A diagram showing the expression $3x^2 + 4x + 5$. The term $3x^2$ is enclosed in a red circle, $4x$ is in a green circle, and 5 is in a blue circle. The plus signs are shared between the adjacent circles.



A diagram showing the expression $2m - 7n$. The term $2m$ is enclosed in a red circle, and $-7n$ is in a blue circle. The minus sign is shared between the two circles.

Sign stays with the number that comes after it!

Coefficient: The numerical factor in a term.

$5x^2$ Coefficient is 5.

$-3m$ Coefficient is -3 .

y Coefficient is 1.

$-n$ Coefficient is -1 .

Combining like terms

Like terms: Variable terms that have the same variable(s) raised to the same exponents, or **constant terms.**

Just numbers; no variables

Like terms

$4x$ and $7x$

$5y^2$ and $10y^2$

$8xy$ and $12xy$

7 and 15

Unlike terms

$2x$ and $8y$ *different variables*

$7t^3$ and $3t^2$ *different exponents*

x^2y and xy^2 *different exponents*

13 and $15x$ *different variables*

Combining like terms

To combine like terms,

- add or subtract the coefficients
- keep the variables and their exponents the same.

$$10y + 8y = 18y$$

$$8x - 3x = 5x$$

$$13y^2 - y^2 = 13y^2 - 1y^2 = 12y^2$$

Combining like terms

$$\begin{aligned} & 5y^2 + 6 + 4y^2 - 7 \\ &= \underbrace{5y^2 + 4y^2} + \underbrace{6 - 7} \\ &= 9y^2 - 1 \end{aligned}$$

Rewrite. Keep the sign with the number that comes after it.

Combine like terms.

$$\begin{aligned} & \cancel{18y} + \cancel{7x} - \cancel{y} - \cancel{7x} \\ &= 17y + 0 \\ &= 17y \end{aligned}$$



Simplify: $7x + 8 - 2x - 4$

a) $9x - 4$

b) $9x + 4$

c) $5x - 4$

d) $5x + 4$



Simplify: $7x + 8 - 2x - 4$

a) $9x - 4$

b) $9x + 4$

c) $5x - 4$

d) $5x + 4$

Distributive Property

The Distributive Property of Multiplication over Addition

$$a(b + c) = ab + ac$$

$$2(5 + 6) = 2(11) \\ = 22$$

$$2(5 + 6) = 2 \cdot 5 + 2 \cdot 6 \\ = 10 + 12 \\ = 22$$

When **evaluating**, don't use the distributive property!!
Follow the order of operations.

Distributive Property

$$2(x + y) = 2x + 2y$$

$$-2(-3a - 5b) = 6a + 10b$$

Sign stays with the number that comes after it!

$$-3(2x - y) = -3(2x - 1y) = -6x + 3y$$

$$-(5y + 8) = -1(5y + 8) = -5y - 8$$

Simplify.

$$-6(x + 7) + 2(x - 4)$$

Distributive Property

$$-6x - 42 + 2x - 8$$

$$-4x - 50$$