

UNIT 1 • RELATIONSHIPS BETWEEN QUANTITIES

Lesson 1: Interpreting Structure in Expressions

Instruction

Guided Practice 1.1.1

Example 1

Identify each term, coefficient, constant, and factor of $2(3 + x) + x(1 - 4x) + 5$.

1. Simplify the expression.

The expression can be simplified by following the order of operations and combining like terms.

$2(3 + x) + x(1 - 4x) + 5$	Distribute 2 over $3 + x$.
$6 + 2x + x(1 - 4x) + 5$	Distribute x over $1 - 4x$.
$6 + 2x + x - 4x^2 + 5$	Combine like terms: $2x$ and x ; 6 and 5 .
$11 + 3x - 4x^2$	

It is common to rearrange the expression so the powers are in descending order, or go from largest to smallest power.

$$-4x^2 + 3x + 11$$

2. Identify all terms.

There are three terms in the expression: $-4x^2$, $3x$, and 11 .

3. Identify any factors.

The numbers or expressions that, when multiplied, produce the product $-4x^2$ are -4 and x^2 . The numbers or expressions that, when multiplied, produce the product $3x$ are 3 and x .

4. Identify all coefficients.

The number multiplied by a variable in the term $-4x^2$ is -4 ; the number multiplied by a variable in the term $3x$ is 3 ; therefore, -4 and 3 are coefficients.

5. Identify any constants.

The number that does not change in the expression is 11 ; therefore, 11 is a constant.



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Example 2

A smartphone is on sale for 25% off its list price. The sale price of the smartphone is \$149.25. What expression can be used to represent the list price of the smartphone? Identify each term, coefficient, constant, and factor of the expression described.

1. Translate the verbal expression into an algebraic expression.

Let x represent the unknown list price. Describe the situation. The list price is found by adding the discounted amount to the sale price:

sale price + discount amount

The discount amount is found by multiplying the discount percent by the unknown list price. The expression that represents the list price of the smartphone is $149.25 + 0.25x$.

2. Identify all terms.

There are two terms described in the expression: the sale price of \$149.25, and the discount of 25% off the list price, or 149.25 and $0.25x$.

3. Identify the factors.

$0.25x$ is the product of the factors 0.25 and x .

4. Identify all coefficients.

0.25 is multiplied by the variable, x ; therefore, 0.25 is a coefficient.

5. Identify any constants.

The number that does not change in the expression is 149.25; therefore, 149.25 is a constant.



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Example 3

Helen purchased 3 books from an online bookstore and received a 20% discount. The shipping cost was \$10 and was not discounted. Write an expression that can be used to represent the total amount Helen paid for 3 books plus the shipping cost. Identify each term, coefficient, constant, and factor of the expression described.

1. Translate the verbal expression into an algebraic expression.

Let x represent the unknown price. The expression used to represent the total amount Helen paid for the 3 books plus shipping is $3x - 0.20(3x) + 10$.

2. Simplify the expression.

The expression can be simplified by following the order of operations and combining like terms.

$$3x - 0.20(3x) + 10$$

Multiply 0.20 and $3x$.

$$3x - 0.60x + 10$$

Combine like terms: $3x$ and $-0.60x$.

$$2.4x + 10$$

3. Identify all terms.

There are two terms in the described expression: the product of 2.4 and x , and the shipping charge of \$10: $2.4x$ and 10.

4. Identify the factors.

$2.4x$ is the product of the factors 2.4 and x .

5. Identify all coefficients.

2.4 is multiplied by the variable, x ; therefore, 2.4 is a coefficient.

6. Identify any constants.

The number that does not change in the expression is 10; therefore, 10 is a constant.

