

Guided Practice 1.3.1

Example 1

Simplify the expression $2(3 + x) + x(1 - 4x) + 5$, then identify each term, coefficient, and constant, and name the factors of each term of the polynomial.

1. Simplify the expression.

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

$2(3 + x) + x(1 - 4x) + 5$	Given expression
$6 + 2x + x(1 - 4x) + 5$	Distribute 2 over $3 + x$.
$6 + 2x + x - 4x^2 + 5$	Distribute x over $1 - 4x$.
$6 + 5 + 2x + x - 4x^2$	Rearrange to group like terms.
$11 + 3x - 4x^2$	Combine like terms: add 6 and 5, then add $2x$ and x .

It is common to rearrange the expression so the powers are in descending order; that is, from the largest power to the smallest power:

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


2. Identify each term in the simplified expression.

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



3. Identify any factors of the non-constant term(s).

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 any coefficients of the non-constant term(s).

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



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5. Identify any constant terms.

The term that does not change in the expression is 11.
Therefore, 11 is the constant term.



Example 2

A smartphone is on sale for 25% off its regular price. The sale price of the smartphone is \$149.25. What expression can be used to represent the regular price of the smartphone? Identify each term, the constant term, and the factors and coefficients of the terms that contain a variable.

1. Translate the verbal expression into an algebraic expression.

First, describe the situation. The regular price is found by adding the discount amount to the sale price:

sale price + discount amount

We know that the sale price is \$149.25. The discount amount is found by multiplying the discount percent by the unknown regular price. The discount percent is 25%, or written as a decimal, 0.25. Let x represent the unknown regular price. Therefore, the algebraic expression that represents the regular price of the smartphone is $149.25 + 0.25x$.

2. Identify each term in the algebraic expression.

There are two terms in the expression: 149.25 and $0.25x$. The term 149.25 represents the sale price, and $0.25x$ represents the discount.

3. Identify any factors of the non-constant term(s).

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

4. Identify any coefficients of the non-constant term(s).

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

5. Identify any constant terms.

The term that does not change in the expression is 149.25.
Therefore, 149.25 is the constant term.



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Lesson 3: Interpreting Formulas and Expressions

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Example 3

Helen purchased 3 books from an online bookstore and received a 20% discount on her total order. Each book cost the same amount. 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. Simplify the expression, and then identify each term, the constant term, and the factors and coefficients of the terms that contain a variable.

1. Translate the verbal expression into an algebraic expression.

First, describe the situation. The total amount Helen paid can be found by subtracting the discount amount from the price of the 3 books, then adding the shipping cost:

price of 3 books – discount amount + shipping cost

Let x represent the unknown price of 1 book. Multiply x by the number of books purchased. Helen bought 3 books, so the term $3x$ represents the price of the books.

Helen received 20% off the price of the books. Written as a decimal, 20% is equal to 0.20. The amount of the discount Helen received off the price of the 3 books can be found by multiplying 0.20 by $3x$. So, $0.20(3x)$ represents the discount amount.

Finally, Helen paid an additional \$10 for shipping. This represents the shipping cost.

The algebraic 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.

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

Expression from the previous step

$$3x - 0.60x + 10$$

Multiply 0.20 and $3x$.

$$2.4x + 10$$

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

The simplified expression representing the total amount Helen paid for the books is $2.4x + 10$.

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3. Identify each term in the simplified expression.

There are two terms in the simplified expression: $2.4x$ and 10. The term $2.4x$ represents the price of the books minus the discount, and 10 represents the shipping cost.



4. Identify any factors of the non-constant term(s).

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



5. Identify any coefficients of the non-constant term(s).

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



6. Identify any constant terms.

The term that does not change in the expression is 10. Therefore, 10 is the constant term.

