

KEY POINTS

Section 1.3 Equivalent Expressions

- When are expressions equivalent?
- Evaluating expressions to see when they are equal
- Constructing expressions

Section 1.4 Equivalent Equations

- When are equations equivalent?
- Valid operations on equations
- Isolating variables
- The difference between equivalent equations and equivalent expressions.

Warm - Up

Section 1.3
Equivalent
Expressions

Write about how expressions and equations are similar and different.

Share Out

Section 1.3
Equivalent
Expressions

Similarities

Differences

Examples

Example #1

You are given two expressions that you have to determine if they are equal or not.

Section 1.3
Equivalent
Expressions

$$\frac{t}{2}$$

$$\frac{1}{2}t$$

How can we determine if these two expressions are equal?

Examples

Using what we know determine if the following expressions are equivalent or not.

Section 1.3
Equivalent
Expressions

$$\sqrt{x + y}$$

$$\sqrt{x} + \sqrt{y}$$

$$\frac{a}{b+c}$$

$$\frac{a}{b} + \frac{a}{c}$$

Examples

Using what we know determine if the following expressions are equivalent or not.

Section 1.3
Equivalent
Expressions

$$(9 + 6x) / 3$$

$$3 + 6x$$

$$2x^2$$

$$(2x)^2$$

Examples

Section 1.3 Equivalent Expressions

Example #2

Italian coffee costs 7 dollars per pound and Kenyan coffee costs 10 dollars per pound. Write an expression for the total amount spent on these coffees if you buy m pounds of Italian coffee and n pounds of Kenyan coffee.

Write an expression for the sum of three consecutive integers, if the first integer is n .

Examples

Section 1.3 Equivalent Expressions

When we say that two expressions, such as $x + x$ and $2x$, are equivalent we are really saying: "For all numbers x , we have $x + x = 2x$." This statement looks like an equation.

In order to distinguish this use of equations, we refer to $x + x = 2x$ as an **identity**.

An **identity** is really a special equation, one that is satisfied by all values of the variables

Practice

Section 1.3 Equivalent Expressions

Find a value for x that will show the two expressions are not equivalent

$$2x + 8 \quad \text{and} \quad x + 4$$

Are the expressions equivalent?

$$(x - y) + z \quad \text{and} \quad x - (y + z)$$

Practice

Section 1.3 Equivalent Expressions

Are the following equations identities?

$$3x + x = 4x$$

$$2x^2 + 3x^4 = 5x^6$$

Key Points

Section 1.3 Equivalent Expressions

- When are expressions equivalent?
- Evaluating expressions to see when they are equal
- Constructing expressions

Section 1.4 Equivalent Equations

- When are equations equivalent?
- Valid operations on equations
- Isolating variables
- The difference between equivalent equations and equivalent expressions.

Discussion

Section 1.4
Equivalent
Equations

If you are given the equation $3x + 12 = 36$, how can we make it a simpler equation?

Discussion

Section 1.4
Equivalent
Equations

What we have done is something called **isolating the variable**.

What does isolating the variable allow us to do?

Examples

Section 1.4 Equivalent Equations

Without solving explain why each pair of equations have the same solution.

a. $4(w - 2)^2 = 6$ $(w - 2)^2 = \frac{6}{4}$

b. $\frac{x-4}{12} = -3$ $x - 4 = -36$

c. $y^4 + 3y + 4 = y^4 + 2$ $3y + 4 = 2$

Vocabulary

Section 1.4 Equivalent Equations

What we have just done is found a way to make two equations equivalent.

EQUIVALENT EQUATIONS

We say two equations are *equivalent* if they have exactly the same solutions

Examples

Section 1.4 Equivalent Equations

In the following equations we are going to isolate the variable, using reverse operations.

1. $5x - 4 = 26$

Examples

Section 1.4 Equivalent Equations

In the following equations we are going to isolate the variable, using reverse operations.

2. $\frac{1}{6}(8 + x) = 10$

Examples

Section 1.4 Equivalent Equations

In the following equations we are going to isolate the variable, using reverse operations.

3. $\frac{x-3}{7} = 1$

General Info

Section 1.4 Equivalent Equations

We can transform an equation into an equivalent equation using any operation that does not change the balance between the two sides.

- Adding or subtracting the same number to both sides
- Multiplying or dividing both sides by the same number, provided that it is not zero
- Replacing any expression in an equation by an equivalent expression

Homework

Section 1.3
Equivalent
Expressions

Pages 16 - 17
2 - 12 even, 20 - 23, 34, 37

Section 1.4
Equivalent
Equations

Pages 23 - 24
2 - 16 even, 17 - 27 odd, 35 - 44

