

KEY POINTS

Section 1.1 Expressions

- Letters are used to represent numbers
- Algebraic expressions represent calculations with numbers
- Algebraic expressions can be read, written, and evaluated
- Terms and factors are used to build expressions
- Recognizing patterns

Section 1.2 Equations

- What is an equation?
- What is a solution to an equation?
- Writing equations
- What is an identity?
- Using equations to solve problems

Warm - Up

Section 1.1
Expressions

Write down as many formulas as you can for areas and volumes.

Share Out

Section 1.1
Expressions

Formulas

$$A = bh$$

$$A = \pi r^2$$

$$A = \frac{bh}{2}$$

Characteristics of Expressions

Expressions do not have equal signs
Expressions show a process

Examples

Section 1.1 Expressions

Example #1

The formula for body mass index is weight in kilos divided by height, in meters, squared. Write the formula: w/h^2

1. What does the calculation $\frac{70}{2^2}$ represent?

This represents the BMI of a person who weighs 70 kilos and is 2 m tall.

2. What is the effect on the body mass index when h is increased and w is unchanged?

The BMI decreases

3. What is the effect on the body mass index when w is decreased and h is unchanged?

The BMI decreases.

Examples

Section 1.1 Expressions

Example #2

If the tag price on a pair of jeans is p dollars and the sales tax is 5.6%, how much do you pay?

Brainstorm!

$$p(.056)$$

$$p = x 5.6$$

Formulas

$$p + .056(p)$$

Examples

Section 1.1 Expressions

Example #3

Read each of the following expressions and describe to your partner the sequence of operations.

1. $2(n+1) - 3$

Add 1 to n , multiply result by 2, subtract 3

2. $(2n+1) - n$

multiply n by 2, add 1, subtract n from result

3. $\underline{2l + w}$ and $\underline{2(l + w)}$

multiply L by 2, add w

Add L to w , multiply result by 2.

4. $\underline{(a+b)^2}$ and $\underline{a^2 + b^2}$

Add a to b , square the result

Square a , square b , add the results

Examples

Example #4

Evaluate $3x - 4y$ and $4x^2 + 9x + 7y$ using the following:

1. $x = 2, y = -5$

$$3x - 4y$$

$$3(2) - 4(-5)$$

$$6 + 20$$

$$\textcircled{26}$$

$$4x^2 + 9x + 7y$$

$$4(2)^2 + 9(2) + 7(-5)$$

$$4(4) + 9(2) + 7(-5)$$

$$16 + 18 - 35$$

$$34 - 35$$

$$\textcircled{-1}$$

Section 1.1
Expressions

Practice

Section 1.1 Expressions

Evaluate the expressions using the values given

1. $4x^2 + 2y^4$; $x = 2$, $y = -1$

Describe the sequence of operations that produces the expression.

2. $5(x - 2)$

subtract 2 from x
multiply result
by 5.

3. $4 - 2(x - 1)$

subtract 1 from x
multiply by 2
subtract result from
4

Practice

Section 1.1 Expressions

Write an expression for the sequence of operations.

4. Add x to 1, triple, subtract 2

$$3(1+x) - 2$$

5. Subtract x from 2, double, add 8

$$2(2-x) + 8$$

Practice

Section 1.1 Expressions

Write an expression for the sales tax on a car.

6. Tax rate is 5%, price is \$ d

$$.05d$$

7. Tax rate is 7%, price is \$550 less than the sticker price

$$.07(d - 550)$$

Practice

Section 1.1 Expressions

A family buys 12 bags of hamburger buns and 60 hamburger patties. Write an expression that will help us to find the total cost if the hamburger buns cost h dollars and the hamburger patties cost p dollars.

$$12h + 60p$$

Homework

Section 1.1 Pages 6 -7

Expressions # 2 - 10 even, 13, 15, 20 - 23, 25, 26, 28, 30, 33,
34, 56 - 58

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Section 1.2 Equations

- What is an equation?
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Warm-Up

Write an expression for the sales tax on a car.

1. Tax rate is 5%, price is \$d

$$\text{Price} = d + (.05d)$$

.05d

Discussion

Section 1.2 Equations

$$3x + 2 = 10 - x$$

This is known as an equation.

Is this equation true or false?

Equations equate 2 expressions

Discussion

Section 1.2 Equations

X	$3X + 2$	$10 - X$
-2	-4	12
-1	-1	11
0	2	10
1	5	9
2	8	8

$10 - (-2)$
+

Examples

Section 1.2 Equations

Example #1

You started with \$ p , paid \$40 for a pair of jeans, and had \$30 left.

Equation: $p - 40 = 30$

Example #2

You started with \$80, paid \$ p for a pair of jeans, and had \$35 left.

Equation: $80 - p = 35$

Examples

Section 1.2 Equations

Example #3

For each of the following equations, which of the given values is a solution?

a) $3 - 4t = 5 - (2 + t)$, for the values $t = -3, 0$

$$\begin{aligned} 3 - 4(-3) &= 5 - (2 + -3) \\ 3 + 12 &= 5 - (-1) \\ \text{X } 15 &= 6 \end{aligned}$$

$$\begin{aligned} 3 - 4(0) &= 5 - (2 + 0) \\ 3 &= 5 - 2 \\ 3 &= 3 \checkmark \end{aligned}$$

b) $3x^2 + 5 = 8$, for the values $x = -1, 0, 1$

Examples

Section 1.2 Equations

Example #4

You have \$10.00 to spend on n bottles of soda, costing \$1.50 each. Are the following expressions? Equations? Justify your answers.

a) $1.50n$ expression, no = sign

b) $1.50n = 6.00$ equation, 2 expressions =

c) $10 - 1.50n$ expression, no = sign

d) $10 - 1.50n = 2.50$ equation

Practice

Section 1.2 Equations

Write an equation representing the situation if c is the cost of movie tickets in dollars.

1. The cost for a family of four to attend the movies is \$42.

$$c \cdot 4 = 42$$
$$4c = 42$$

Write in words the statement represented by the equation.

2. $0.25x = 12$

25 percent of x equals 12

x multiplied by 0.25 equals 12

Practice

Section 1.2 Equations

Determine if the given value of the variable is a solution to the equation.

3. $x + 4 = x^2 - 16$; $x = 4$; $x = -4$

Solve the equation.

4. $v + 5 = 15$

$$v = 10$$
$$10 + 5 = 15$$

5. $x^2 = 49$

$$x = 7$$

Practice

Section 1.2
Equations

Construct a table showing the values of the expression
 $2 + 3x$ for $x = 0, 1, 2, 3, 4$

Homework

Section 1.2
Equations

Pages 11 - 13

2, 3, 5 - 13, 16 - 18, 21, 23, 25 - 35 odd, 37, 39,
40, 42, 43, 44