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Focus Lesson

An **expression** is a group of numbers, operations, and symbols that describes the value of something. An **algebraic expression** includes **variables**, symbols or letters that represent unknown values or values that can change. A **numeric expression** is an expression with numbers and operations but no variables.

Words can be translated into expressions, as shown in the examples below.

Words	Expression
Six more than a number	$x + 6$
Six less than a number	$x - 6$
A number less than six	$6 - x$
Six times a number	$6x$
The quotient of a number and 6	$\frac{x}{6}$

Expressions can sometimes be written in different ways to represent the same value. These expressions are called **equivalent expressions**.



The number of ticket sales reported by a theater this month was 12% fewer than the number of ticket sales reported by the theater last month. If the number of ticket sales reported by the theater last month was x , which of the following expressions could represent the number of ticket sales reported by the theater this month? Select all that apply.

- A $0.88x$
- B $1.12x$
- C $-0.12x$
- D $x - 0.12$
- E $x - 0.12x$
- F $x + 0.12x$

1 What operation is indicated by the words *12% fewer*? _____

2 Write an expression to represent 12% of the ticket sales last month. _____

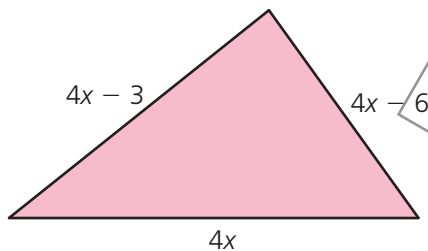
3 How is this expression related to the ticket sales this month?

4 What is one expression that could represent the number of ticket sales this month? _____

From the given expressions, which could represent the number of ticket sales this month?

Guided Practice

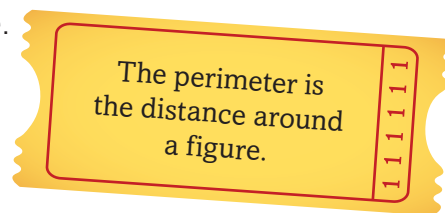
This diagram shows the lengths, in units, of a triangle.



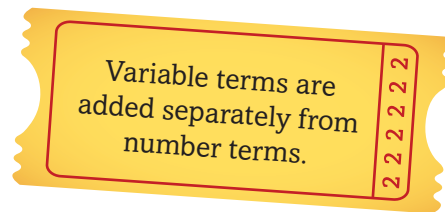
In each row of the table below, mark the appropriate box with an X to indicate whether or not the expression is equivalent to the perimeter, in units, of the triangle.

Expression	Equivalent to Perimeter	Not Equivalent to Perimeter
$4x - 9$		
$4(3x) - 9$		
$3(4x - 1 - 2)$		
$3(4x) + 3(-3 - 6)$		
$4x + 4x + 4x - 3 - 6$		

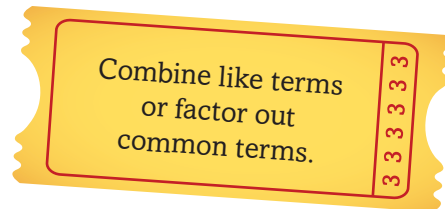
1 Describe in words how to find the perimeter of a triangle.



2 What is one expression that can be used to represent the perimeter of this rectangle?



3 Describe in words at least one way the expression you wrote can be written another way.



Which expressions in the table are equivalent to the perimeter of the triangle?

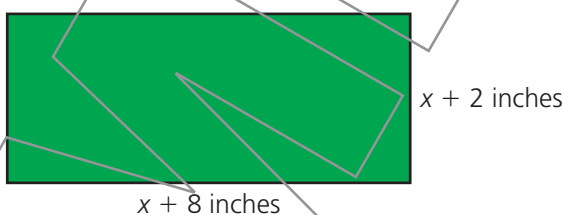
Independent Practice

Solve the following problems.

- 1 The height of a tree increased by 10% during one year. The height of the tree at the beginning of the year was h feet. Which of the following expressions could represent the height of the tree now? Select all that apply.

- A $0.10h$
- B $1.10h$
- C $h + 10$
- D $h + 0.10$
- E $h(1 + 0.1)$
- F $h(1 + 10)$

- 2 The diagram below shows the dimensions of a rectangle.



The expression $2(x + 8 + x + 2)$ represents the perimeter, in inches, of the rectangle. Which of the following expressions is equivalent to this perimeter? Select all that apply.

- A $2x + 10$
- B $2x + 20$
- C $4x + 20$
- D $2x + 8 + x + 2$
- E $2(2x) + 2(8 + 2)$



Independent Practice

- 3 The length of a rectangle is 6 centimeters less than twice the width of the rectangle.
- The width of the rectangle is w centimeters.
 - The expression $2w + 6$ represents the length, in centimeters, of the rectangle.

Which of the following expressions can be used to represent the area, in square centimeters, of the rectangle? Select all that apply.

- A** $2w^2 - 6$
- B** $2w - 6w$
- C** $2w^2 - 6w$
- D** $w(2w) - 6$
- E** $w(2w - 6)$
- F** $w(2w) - w(6)$
- 4 Ronan bought a baseball glove on sale. The price of the baseball glove was discounted by $\frac{1}{3}$ off the regular price. Ronan paid 5% sales tax on the discounted price. The regular price of the baseball glove was b dollars. Which of the following expressions represents the total price Ronan paid for the baseball glove? Select all that apply.

- A** $\frac{1}{3}b + 0.05b$
- B** $\frac{2}{3}b + 0.05b$
- C** $\frac{2}{3}b + 0.05\left(\frac{2}{3}b\right)$
- D** $\frac{2}{3}b + 1.05\left(\frac{2}{3}b\right)$
- E** $\left(1 - \frac{1}{3}\right)b + (0.05)\left(\frac{2}{3}b\right)$
- F** $\left(1 - \frac{1}{3}\right)b + (1 + 0.05)\left(\frac{2}{3}b\right)$

Independent Practice

5 Figures 1, 2, and 3 shown below were created using square tiles.



Figure 1

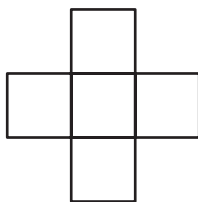


Figure 2

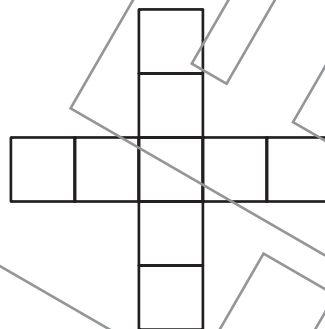


Figure 3

The expression $4n - 3$ can be used to represent the number of square tiles in a figure, where n represents the figure number.

In each row of the table below, mark the appropriate box with an X to indicate whether or not the expression can be used to find the number of square tiles in Figure n .

Expression	Equivalent to Number of Square Tiles in Figure n	Not Equivalent to Number of Square Tiles in Figure n
$(4 - 1)n$		
$4(n + 1)$		
$1 + 4n - 4$		
$1 + 4(n - 1)$		
$1 + (4 - 1)n$		