Name: $\qquad$ Date: $\qquad$

## Lesson 3.6 Writing Algebraic Expressions

## Translate each verbal description into an algebraic expression. Simplify the expression where possible.

## Example

a) Last week, a painter mixed $x$ quarts of white paint with some red paint to make 12 quarts of pink paint. This week, he uses $20 \%$ less white paint to make the pink paint. Write an expression for the number of quarts of pink paint he made this week.

12 plus $\underbrace{-0.2}$ times $\underbrace{x}$


Translate by parts.

$$
\begin{array}{ll}
\frac{y+0.02 y}{1.02 y} & \text { Combine. } \\
= & \text { Simplify }
\end{array}
$$

She had $1.02 y$ dollars in her bank account at the end of the year.
c) Five jugs each contained q liters of water. Mark needs one-third of the amount of water less 5 liters. Find the amount of water Mark needs.

One-third of the product of 5 and $q$ less $\underbrace{5}$
$\frac{1}{3}$
$5 q \quad-\quad 5$


Mark needs $\underline{\frac{5}{3} q-5}$
liters of water.

## Complete.

1. Paige purchased $5 x$ pounds of flour to make 4 identical sponge cakes.

How much flour does each sponge cake require?
$\underbrace{5 x}$ shared among $\underbrace{4}$


$$
=
$$

Each sponge cake requires $\qquad$ pounds of flour.
2. David bought an antique watch for $w$ dollars. He later sold it and made a $30 \%$ profit. Write an algebraic expression for the sales price of the watch.

$$
\underline{w} \quad \text { increased by } \quad \underbrace{30 \%}
$$

$\qquad$
$=$

$\qquad$ $+$ $\qquad$
= $\qquad$
He sold the watch for $\qquad$ dollars.

## Translate the verbal description into an algebraic expression. Simplify the expression where possible.

3. Gary earned $x$ dollars and James earned $\frac{1}{3} x$ dollars last month. Gary saved half of his income and James saved one-fifth of his income. Write an expression for the total amount that Gary and James saved.

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Solve. You may use a diagram, model, or table.

## Example

a) The length of a basketball court is $(8 x-10)$ feet and its width is $6 x$ feet. Write an algebraic expression for the perimeter of the court.

Perimeter of the field:
$(8 x-10)+6 x+(8 x-10)+6 x=28 x-20$
The perimeter of the court is $(\underline{28 x}-20)$ feet.

b) At a supermarket, cherry tomatoes are sold for $\$ 0.75$ per pound, zucchinis are sold for $\$ 1.80$ per pound, and red peppers are sold for $\$ 3.45$ per pound. Danny bought $x$ pounds of cherry tomatoes, $\frac{1}{2} \times$ pounds of zucchinis, and $3 y$ pounds of red peppers. What was the total cost of the vegetables purchased by Danny?

| Vegetable | Price Per Pound | Total Weight | Cost |
| :--- | :---: | :---: | :---: |
| Cherry Tomatoes | $\$ 0.75$ | $x$ | $\$ 0.75 x$ |
| Zucchinis | $\$ 1.80$ | $\frac{1}{2} x$ | $\$ 0.90 x$ |
| Red Peppers | $\$ 3.45$ | $3 y$ | $\$ 10.35 y$ |

Total cost of vegetables:
$\$ 0.75 x+\$ 0.90 x+\$ 10.35 y=\$(1.65 x+10.35 y)$
The total cost of the vegetables was $\$(\underline{1.65 x+10.35 y})$.
c) Sandy had $m$ balloons, but then 5 balloons burst. She divided the rest equally among her 6 nieces. How many balloons did each niece receive?

Before
Balloons


After
Balloons

( $m-5$ ) balloons divided 5 balloons among 6 nieces burst

From the bar model, number of balloons each niece received: $\frac{1}{6}(m-5)=\frac{1}{6} m-\frac{5}{6} \quad$ Use the distributive property.


Each niece received $\left(\underline{\frac{1}{6} m}-\frac{5}{6}\right)$ balloons.

## Complete.

4. Felicia drew an isosceles triangle with a base length of $3 x$ inches and side lengths of $\left(\frac{1}{4} x+3\right)$ inches. Write an algebraic expression for the perimeter of the triangle.

Perimeter of the triangle:
$\qquad$ $+$ $\qquad$ $+$ $\qquad$
$=$ $\qquad$


The perimeter of the triangle is $\qquad$ inches.

## Solve. You may use a diagram, model, or table.

5. The admission fees to an amusement theme park are $\$ 45$ per adult and $\$ 25$ per child. A tour group of $2 x$ adults and $(3 x-8)$ children visited the park. How much did the tour group pay in total?
6. A one-way train ticket from New York to Los Angeles costs $\$ 197$ for a reclining seat, and $\$ 490$ for a twin-sharing room. How much would it cost if $x$ passengers booked reclining seats and $\frac{1}{5} y$ passengers booked twin-sharing rooms?
7. Colin had $x$ dollars to spend in a week. He spent $\$ 20$ on Monday and on Tuesday. He then spent the rest equally on each day for the rest of the week. How much did Colin spend on Thursday?
