Show all of your work for the problems in this packet, even the multiple choice ones. If you do not have written work to show, explain your thinking.
Chapter 7
Reteach
Algebraic Expressions

Activity 5  Real-World Problems: Algebraic Expressions

Draw a bar model to show each operation.

1 18 + 5

2 32 ÷ 4

Solve.

Example

Kevin had 4 kilograms of flour. He used m kg of flour to bake a cake.

a) Find the amount of flour Kevin had left in terms of m.

\[
\text{Amount of flour left} = (4 - m) \text{ kg}
\]

Kevin had \(4 - m\) kilograms of flour left.

b) If he used 2 kg of flour to bake the cake, how much flour did Kevin have left?

\[
4 - 2 = 2
\]

Kevin had 2 kilograms of flour left.
Caroline had \( r \) rolls of ribbon. She used 6 rolls of ribbon to decorate presents.

a Find the number of rolls of ribbon she had left in terms of \( r \).

\[
\begin{array}{c}
\text{r} \\
\text{6} \\
\text{?}
\end{array}
\]

Number of rolls left = \( (\text{r} - \text{6}) \)

Caroline had \( \text{?} \) rolls of ribbon left.

b If she had 18 rolls of ribbon at first, how many rolls of ribbon did she have left?

\[
\begin{array}{c}
\text{18} \\
\text{6} \\
\text{?}
\end{array}
\]

\( \text{18} - \text{6} = \text{?} \)

Caroline had \( \text{?} \) rolls of ribbon left.

Joshua had \( b \) notebooks. He gave an equal number of notebooks to each of his 4 sisters.

a Find the number of notebooks each sister received in terms of \( b \).

\[
\begin{array}{c}
\text{b} \\
\text{?}
\end{array}
\]

Number of notebooks each sister received = \( \text{?} \)

Each sister received \( \text{?} \) notebooks.

b If Joshua had 20 notebooks at first, how many notebooks did each sister receive?

\[
\begin{array}{c}
\text{20} \\
\text{?}
\end{array}
\]

Number of notebooks each sister received = \( \text{?} \)

Each sister received \( \text{?} \) notebooks.
5  Lily bought $b$ bottles of oil at $\$4$ each. She gave the cashier $\$20$.
   a  Find the amount of change Lily received in terms of $b$.

   b  If Lily bought 4 bottles of oil, how much change did she receive?

6  Grace bought 3 bottles of sauces at $\$s$ each. She gave the cashier $\$25$.
   a  Find the amount of change Grace received in terms of $s$.

   b  If $s = 5$, how much change did she receive?
**Chapter 8**

**Reteach**

**Equations and Inequalities**

Activity 1  Solving Algebraic Equations

Evaluate each expression for the given values of the variable.

1. \(4x + 15\) when \(x = 3\) and \(x = 12\)

2. \(22 - 5y\) when \(y = 6\) and \(y = 11\)

Solve each equation using the substitution method.

**Example**

Solve the equation \(a + 1 = 3\).

The equation \(a + 1 = 3\) can be represented on a balance scale:

If \(a = 1\), \(\underline{1} + 1 = \underline{2}\) (\(\neq 3\))

If \(a = 2\), \(\underline{2} + 1 = \underline{3}\)

The equation \(a + 1 = 3\) holds true when \(\underline{a = 2}\).

\(\underline{a = 2}\) gives the solution of the equation \(a + 1 = 3\).
3 Solve the equation $2x = 8$.

The equation $2x = 8$ can be represented on a balance scale:

If $x = 1$, $2 \cdot \underline{_____} = \underline{______}$

If $x = 2$, $2 \cdot \underline{_____} = \underline{______}$

If $x = 3$, $2 \cdot \underline{_____} = \underline{______}$

If $x = 4$, $2 \cdot \underline{_____} = \underline{______}$

The equation $2x = 8$ holds true when $\underline{______}$ gives the solution of the equation $2x = 8$.

4 $a + 8 = 12$

5 $a - 2 = 4$

6 $5x = 25$

7 $\frac{1}{4}x = 18$
Solve each equation.

Example

Solve the equation \( a + 10 = 14 \).

\[
\begin{align*}
\text{a + 10} & \quad \text{14} \\
\begin{array}{l}
\text{a} \\
\end{array} & \quad \begin{array}{l}
\text{10} \\
\end{array} \\
\text{\text{Subtract 10 from both sides.}} \\
\text{a} & \quad \text{4}
\end{align*}
\]

\( a = 4 \) gives the solution of the equation \( a + 10 = 14 \).

8 Solve the equation \( a - 5 = 13 \).

\[
\begin{align*}
\text{a - 5} & \quad \text{13} \\
\begin{array}{l}
\text{a} \\
\end{array} & \quad \begin{array}{l}
\text{5} \\
\end{array} \\
\text{\text{Add 5 to both sides.}} \\
\text{a} & \quad \text{18}
\end{align*}
\]

\( a = 18 \) gives the solution of the equation \( a - 5 = 13 \).

9 \( x + 7 = 18 \)

10 \( x - 4 = 12 \)
Solve each equation.

Example

a \[ 2a = 4 \]

\[
\begin{array}{c}
\frac{2a}{a} = 4 \\
\frac{a}{a} \\
\end{array}
\]

Divide both sides by \( 2 \).

\[ a = \frac{4}{2} \]

\[ a = 2 \] gives the solution of the equation \( 2a = 4 \).

b \[ \frac{x}{2} = 22 \]

\[
\begin{array}{c}
\frac{x}{2} = 22 \\
\frac{x}{2} = 2 \\
\end{array}
\]

Multiply both sides by \( 2 \).

\[ x = 44 \]

\[ x = 44 \] gives the solution of the equation \( \frac{x}{2} = 22 \).
13 Solve the equation $3a = 9$.

\[
\begin{align*}
3a &= 9 \\
\frac{3a}{a} &= \frac{9}{a} \\
\end{align*}
\]

Divide both sides by $a$.

\[
\begin{align*}
a &= \frac{9}{3} \\
&= 3
\end{align*}
\]

$a = 3$ gives the solution of the equation $3a = 9$.

14 Solve the equation $\frac{x}{3} = 9$.

\[
\begin{align*}
\frac{x}{3} &= 9 \\
\frac{x}{3} &= \frac{9}{3} \\
\end{align*}
\]

Multiply both sides by $3$.

\[
\begin{align*}
x &= 9 \times 3 \\
&= 27
\end{align*}
\]

$x = 27$ gives the solution of the equation $\frac{x}{3} = 9$.

Solve each equation.

15 $4b = 24$

16 $5c = 30$
17. $3c = 18$
18. $5c = 15$
19. $\frac{y}{3} = 7$
20. $6 = \frac{e}{2}$
21. $\frac{y}{5} = 4$
22. $12 = \frac{e}{6}$
Solve the equation. Express your answer in simplest form.

Example

a  \[ a + \frac{1}{6} = \frac{5}{6} \]

Subtract \( \frac{1}{6} \) from both sides.

\[ a = \frac{4}{6} \]

Simplify.

\[ a = \frac{2}{3} \]

b  \[ 2x = \frac{1}{5} \]

Divide both sides by \( 2 \).

\[ x = \frac{1}{5} \cdot \frac{1}{2} \]

Multiply by the reciprocal of the divisor.

\[ x = \frac{1}{10} \]

23  \[ a + \frac{3}{7} = \frac{6}{7} \]

_____ from both sides.

\[ a = \_____ \]

24  \[ 3x = \frac{3}{4} \]

_____ both sides by _____.

\[ x = \_____ \]

Multiply by the reciprocal of the divisor.

\[ x = \_____ \]
25 \( x + \frac{2}{9} = \frac{5}{9} \)

26 \( x + \frac{5}{12} = \frac{7}{12} \)

27 \( x + \frac{3}{11} = \frac{8}{11} \)

28 \( x + \frac{5}{9} = \frac{8}{9} \)

29 \( 4x = \frac{2}{7} \)

30 \( 5x = \frac{3}{8} \)

31 \( 3x = \frac{1}{8} \)

32 \( 2x = \frac{3}{4} \)
Activity 2  Real-World Problems: Fractions

Express each improper fraction as a mixed number in simplest form.

1. \[ \frac{25}{8} \]
2. \[ \frac{31}{5} \]
3. \[ \frac{47}{7} \]
4. \[ \frac{52}{6} \]

Express each mixed number as an improper fraction.

5. \[ 8 \frac{6}{7} \]
6. \[ 10 \frac{3}{4} \]
Multiply. Write each product in simplest form.

7 \( \frac{3}{8} \times \frac{4}{9} \)

8 \( \frac{3}{10} \times \frac{5}{6} \)

9 \( \frac{21}{11} \times \frac{33}{7} \)

10 \( \frac{3}{4} \times \frac{5}{12} \)

Divide. Write each quotient in simplest form.

11 \( \frac{2}{3} \div 8 \)

12 \( \frac{10}{11} \div 5 \)

13 \( 15 \div \frac{1}{6} \)

14 \( 20 \div \frac{1}{7} \)
Solve.

Example

A group of children shared 3 cakes equally among themselves. Each child received \( \frac{3}{4} \) of a cake. How many children were there?

\[
3 \div \frac{3}{4} = \frac{3}{1} \times \frac{4}{3}
\]

\[
= 4
\]

There were \( 4 \) children.

15 Chloe had a birthday party. 6 liters of apple juice were prepared for her guests. Each of them had \( \frac{2}{5} \) litre of apple juice. How many guests were there?

\[
6 \div \frac{2}{5} = \frac{6}{1} \times \frac{5}{2}
\]

\[
= 5
\]

There were \( 5 \) guests at the birthday party.
Solve.

Example

Ella bought \( \frac{3}{4} \) kg of chicken. She repacked the chicken into some bags, each contained \( \frac{1}{8} \) kg of chicken. How many bags did she use?

\[
\begin{array}{cccccccc}
\frac{1}{8} \text{kg} & \frac{1}{8} \text{kg} & \frac{1}{8} \text{kg} & \frac{1}{8} \text{kg} & \frac{1}{8} \text{kg} & \frac{1}{8} \text{kg} & \frac{1}{8} \text{kg} & \frac{1}{8} \text{kg}
\end{array}
\]

\[
\frac{3}{4} \div \frac{1}{8} = \frac{3}{4} \times 8
\]

\[
= 6
\]

Ella used \( \boxed{6} \) bags.

16. Ravi had \( \frac{4}{5} \) liter of milk. He drinks \( \frac{1}{10} \) liter of it each day. How many days does he take to finish the milk?

\[
\frac{4}{5} \div \frac{1}{10} = \quad \times \quad \quad
\]

\[
= \quad \quad
\]

He takes \( \boxed{20} \) days to finish the milk.
Solve.

Example

Jessica had 72 similar seashells. She gave \( \frac{4}{9} \) of the seashells to her brother and share the remaining seashells equally with her sister.

a How many seashells did her sister receive?

a Method 1

\[
\begin{align*}
\frac{5}{9} \div 2 &= \frac{5}{9} \times \frac{1}{2} \\
&= \frac{5}{18} \\
\frac{5}{18} \times 72 &= 20
\end{align*}
\]

Her sister received 20 seashells.

Method 2

\[
\begin{align*}
1 - \frac{4}{9} &= \frac{5}{9} \\
\frac{5}{9} \div 2 &= \frac{5}{9} \times \frac{1}{2} \\
&= \frac{5}{18}
\end{align*}
\]

Her sister received \( \frac{5}{18} \) of the seashells.

\[
\frac{5}{18} \times 72 = 20
\]

Her sister received 20 seashells.
b Jessica weighed the remaining seashells that she had left and the total mass was 4/5 kilograms. Find the average mass of each seashell.

b The number of seashells Jessica’s sister had is the same as the number of seashells Jessica had left. So, Jessica had 20 seashells left.

\[
\frac{4}{5} \div 20 = \frac{4}{5} \times \frac{1}{20} = \frac{1}{25}
\]

The average mass of each seashell is 1/25 kilogram.

17 A piece of string was 9/10 meter long. It was cut into 3 equal pieces. One of the pieces was further cut into 5 equal pieces.

a How long was each of the 3 equal pieces of string?

b How long was each of the 5 equal pieces of string?

a \[
\frac{9}{10} \div 3 = \frac{9}{10} \times \frac{1}{3} = \frac{3}{10}
\]

Each of the 3 equal pieces of string was \(\frac{3}{10}\) meter long.

b \[
\frac{3}{10} \div 5 = \frac{3}{10} \times \frac{1}{5} = \frac{3}{50}
\]

Each of the 5 equal pieces of string was \(\frac{3}{50}\) meter long.
Solve.

**Example**

Ms. Jones bought some cans of pineapple to make pineapple cakes. The total mass of the cans she bought was 6 kilograms. The average mass of each can was $\frac{2}{5}$ kilogram.

a. Find the number of cans of pineapple she bought.

\[ 6 \div \frac{2}{5} = \frac{6}{1} \times \frac{5}{2} = 15 \]

She bought 15 cans of pineapple.

b. She used $\frac{3}{4}$ kilogram of canned pineapple to make each cake. How many cakes did she make?

\[ 6 \div \frac{3}{4} = \frac{6}{1} \times \frac{4}{3} = 8 \]

She made 8 cakes.

18. A jug contained 9 liters of water. The water was poured equally into some bottles. Each bottle contained $\frac{3}{4}$ liter of water.

a. How many bottles were there?

\[ 9 \div \frac{3}{4} = \frac{9}{1} \times \frac{4}{3} = 4 \]

There were 4 bottles.

b. 8 bottles of water were shared equally among some children. Each child drank $\frac{2}{3}$ liter of water. How many children were there?

\[ 8 \times \frac{3}{4} = \frac{8}{1} \times \frac{3}{4} = \frac{2}{1} \times \frac{3}{3} = 2 \times 1 = 2 \]

There were 2 children.
A piece of rope was 10 feet long. It was cut into equal intervals of $\frac{8}{9}$ foot long.

a) How many pieces of rope can be cut from the piece of rope?

\[ 10 \div \frac{8}{9} = _______ \times _______ \]

\[ = _______ \]

\[ = _______ \]

\[ _______ \text{ pieces of rope can be cut from the piece of rope.} \]

b) What was the remaining length of the piece of rope?

\[ \text{Number of pieces of rope that can be cut} = _______ \]

\[ _______ \times \frac{8}{9} = _______ \]

\[ = _______ \]

\[ 10 - _______ = _______ \]

The remaining length of the piece of rope was _______ foot.

Solve.

Example

Natalie read $\frac{1}{3}$ of a book on Saturday and another $\frac{1}{4}$ of the book on Sunday. The next day onwards, she read $\frac{1}{12}$ of the book each day until she completes reading the book.

a) How many days does she take to finish the book?
a  **Method 1**

From the bar model, Natalie takes \( \frac{5}{12} \) days to read the remaining \( \frac{5}{12} \) of the book.

Total number of days = \( \frac{5}{12} \) + \( \frac{1}{12} \) + \( \frac{1}{12} \) = \( \frac{7}{12} \)

She takes \( \frac{7}{12} \) days to finish reading the book.

b  **Method 2**

\[
1 - \left( \frac{1}{3} + \frac{1}{4} \right) = 1 - \left( \frac{4}{12} + \frac{3}{12} \right) = 1 - \left( \frac{7}{12} \right) = \frac{5}{12}
\]

\[
\frac{5}{12} \div \frac{1}{12} = \frac{5}{12} \times 12 = \frac{5}{1}
\]

Natalie takes \( \frac{5}{1} \) days to read the remaining \( \frac{5}{12} \) of the book.

Total number of days = \( \frac{5}{12} \) + \( \frac{1}{12} \) + \( \frac{1}{12} \) = \( \frac{7}{12} \)

She takes \( \frac{7}{12} \) days to finish reading the book.

b  She read 48 pages on Saturday. Find the number of pages in the book.

b  \( \frac{4}{12} \) unit = 48

1 unit = 48 ÷ \( \frac{4}{12} \) = \( \frac{12}{1} \)

12 units = \( \frac{12}{1} \) × 12 = 144

The number of pages in the book is 144 pages.
There are some blue, red, and yellow beads in a box. \( \frac{2}{5} \) of the beads are blue, and \( \frac{1}{4} \) of the beads are red. The yellow beads are packed equally into bags.

The number of yellow beads in each bag was \( \frac{1}{20} \) of the total number of beads.

a. How many bags of yellow beads are there?

\[
1 - \left( \frac{2}{5} + \frac{1}{4} \right) = 1 - \left( \frac{\phantom{1}}{\phantom{1}} + \frac{\phantom{1}}{\phantom{1}} \right) \\
= 1 - \left( \frac{\phantom{1}}{\phantom{1}} \right) \\
= \phantom{1} \\
\phantom{1} \div \frac{1}{20} = \phantom{1} \times \phantom{1} \\
\phantom{1} = \phantom{1}
\]

There are \( \phantom{1} \) bags of yellow beads.

b. There are 21 yellow beads. Find the total number of beads in the box.

b. Number of yellow beads in each bag = \( 21 \div \phantom{1} \)

\[
1 \text{ unit} = \phantom{1} \\
\phantom{1} \text{units} = \phantom{1} \times \phantom{1} \\
\phantom{1} = \phantom{1}
\]

The total number of beads in the box is \( \phantom{1} \).
Activity 3  Distance and Speed

Fill in each blank.

Example

a A cat runs a distance of 2 feet in one second. Its speed is ______ feet/s.

b Ava walks at a speed of 0.4 m/s. She walks ______ meter in one second.

1 Mr. Williams drives a distance of 78 kilometers in one hour. His speed is ______ km/h.

2 The hot air balloon rises at a speed of 2.5 m/s. It rises ______ meters in one second.

Solve.

Example

An otter can swim at distance of 1,500 meters in 3 minutes. Find its speed in meters per minute.

Method 1

\[ \text{3 min} \rightarrow 1,500 \text{ m} \]

\[ \text{1 min} \rightarrow \frac{1,500}{3} \text{ m} \]

\[ = 500 \text{ m} \]

The otter’s speed is ______ meters per minute.
Method 2
Distance = 1,500 m
Time = 3 min
Speed = Distance ÷ Time

= \frac{1,500}{3} \ m/min

The otter’s speed is 500 m/min.

To find the speed, you need to know the distance traveled and the time taken.

3 Tristan took 2 hours to drive 140 kilometers from Town A to Town B. At what speed was he driving?

Method 1

2 h → _____ km

1 h → _____ ÷ _____

= _____ km

Tristan was driving at _____ kilometers per hour.

Method 2

Distance = 140 km

Time = 2 h

Speed = Distance ÷ Time

= _____ ÷ _____

= _____ km/h

Tristan was driving at _____ kilometers per hour.
Solve.

**Example**

A cheetah can run at a speed of 110 kilometers per hour. How far can it run in 2 hours?

**Method 1**

\[
\begin{align*}
1 \text{ h} & \rightarrow \frac{110}{1} \text{ km} \\
2 \text{ h} & \rightarrow \frac{110}{1} \times \frac{2}{1} \\
& = \frac{220}{1} \text{ km}
\end{align*}
\]

The cheetah can run 220 kilometers in 2 hours.

**Method 2**

\[
\begin{align*}
\text{Speed} & = 110 \text{ km/h} \\
\text{Time} & = 2 \text{ h} \\
\text{Distance} & = \text{Speed} \times \text{Time} \\
& = \frac{110}{1} \times \frac{2}{1} \\
& = \frac{220}{1} \text{ km}
\end{align*}
\]

The cheetah can run 220 kilometers in 2 hours.

---

4. A car took \(\frac{1}{2}\) hour to drive from a hotel to a park at a speed of 70 kilometers per hour. Find the distance from the hotel to the park.

**Method 1**

\[
\begin{align*}
1 \text{ h} & \rightarrow \frac{70}{1} \text{ km} \\
\frac{1}{2} \text{ h} & \rightarrow \frac{70}{1} \times \frac{1}{2} \\
& = \frac{35}{1} \text{ km}
\end{align*}
\]

The distance from the hotel to the park is 35 kilometers.

**Method 2**

\[
\begin{align*}
\text{Speed} & = 70 \text{ km/h} \\
\text{Time} & = \frac{1}{2} \text{ h} \\
\text{Distance} & = \text{Speed} \times \text{Time} \\
& = \frac{70}{1} \times \frac{1}{2} \\
& = \frac{35}{1} \text{ km}
\end{align*}
\]

The distance from the hotel to the park is 35 kilometers.
**Solve.**

Example

Timothy ran a distance of 2,400 meters at a speed of 200 meters per minute. How long did he take to run 2,400 meters?

**Method 1**

\[
\begin{align*}
200 \text{ m} \rightarrow & \quad \frac{1}{12} \text{ min} \\
2,400 \text{ m} \rightarrow & \quad \frac{2,400}{200} \\
& = 12 \text{ min}
\end{align*}
\]

He took 12 minutes to run 2,400 meters.

**Method 2**

Distance = 2,400 m  
Speed = 200 m/min

\[
\text{Time} = \frac{\text{Distance}}{\text{Speed}}
\]

\[
= \frac{2,400}{200}
\]

\[
= 12 \text{ min}
\]

He took 12 minutes to run 2,400 meters.

---

5. A cat moves at a speed of 30 kilometers per hour. How long does it take to move a distance of 3 kilometers? Give your answer in minutes.

**Method 1**

\[
\begin{align*}
30 \text{ km} \rightarrow & \quad \frac{1}{60} \text{ h} \\
3 \text{ km} \rightarrow & \quad \frac{3}{30} \div \frac{3}{30} \\
& = \frac{1}{60} \text{ h} \\
& = \frac{1}{60} \text{ h}
\end{align*}
\]

It takes \(\frac{1}{60}\) minutes to move a distance of 3 kilometers.

**Method 2**

Distance = 3 km  
Speed = 30 km/h

\[
\text{Time} = \frac{\text{Distance}}{\text{Speed}}
\]

\[
= \frac{3}{30}
\]

\[
= \frac{1}{10} \text{ h}
\]

\[
= \frac{6}{60} \text{ min}
\]

It takes \(\frac{6}{60}\) minutes to move a distance of 3 kilometers.