CHAPTER

7 Algebraic Expressions

Lesson 7.1 Writing Algebraic Expressions

Draw a bar model to show each operation.

1. 25 + 10

2. 3 × 8

3. 17 − 9

4. 24 ÷ 6

Complete with *sum*, *difference*, *product*, *quotient*, *dividend*, or *divisor*.

5. The _____ of 8 and 15 is $\frac{8}{15}$. 8 is the _____

and 15 is the _____.

6. The _____ of 8 and 15 is 8 + 15.

7. The _____ "8 less than 15" is 15 − 8.

8. The _____ of 8 and 15 is 15 × 8.
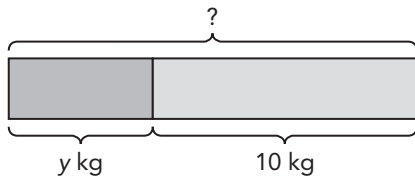
Write an algebraic expression for each of the following.

Example

A box of unknown weight is added to a box whose weight is 10 kilograms.
What is the total weight of the two boxes?

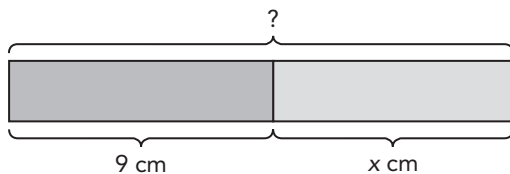> $y + 10$ is an **algebraic expression** in terms of y.

?

y kg   10 kg

The total weight of the two boxes is ___$(y + 10)$___ kilograms.

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9. The sum of 7 and j. _____

10. The sum of m and 10. _____

11. The length of a piece of wood is 9 centimeters. The length of another piece of wood is x centimeters. What is the total length of the two pieces of wood?

?

9 cm x cm

The total length of the two pieces of wood is _____ centimeters.

12. Michael is 3 years old and Jordon is p years old. What is their total age?

_____ years

13. Brandon is y years old.
   a) Jermaine is 2 years older than Brandon. What is Jermaine's age in terms of y?

   _____ years
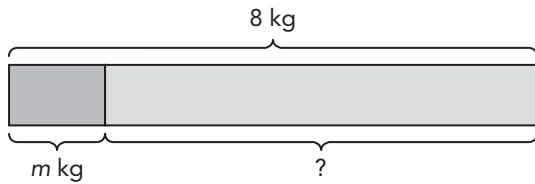
   b) Kent is 5 years older than Jermaine. What is Kent's age in terms of y?

   _____ years

Name: _____   Date: _____

Write an algebraic expression for each of the following.

Example

A box containing soup cans has a mass of 8 kilograms. If the box
weighs m kilograms on its own, what is the weight of the soup cans?

8 kg

8 − m is an algebraic
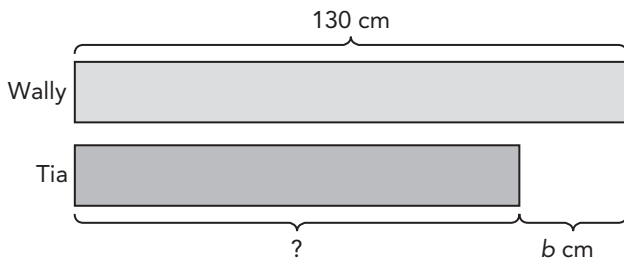expression in terms
of m.

m kg   ?

The weight of the soup cans is ____$(8 − m)$____ kilograms.

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14. The difference "a less than 53". _____

15. The difference "50 less than r". _____

16. Wally is 130 centimeters tall. Tia is b centimeters shorter than Wally.
What is Tia's height?

130 cm

Wally

Tia

? b cm

Tia's height is _____ centimeters.

17. Alexis had $60, and she spent t *dollars*. How much money did she have left?

_____ dollars

18. A small toy shop has m toys for sale in the store.
   a) Tally buys 5 toys. Write an algebraic expression for the number of toys the
   shop has left.

   _____ toys

   b) After Tally leaves the shop, Thomas buys 6 toys. Write an algebraic
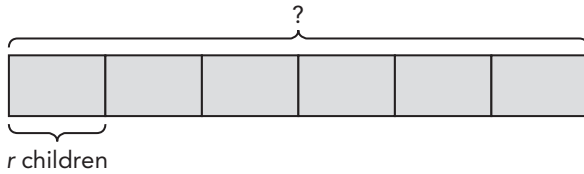   expression for the number of toys the shop has left now.

   _____ toys

Name: _____   Date: _____

Write an algebraic expression for each of the following.

Example

There are 6 groups of children. Each group has *r* children. How many children are there altogether?

?

r children

6*r* is an algebraic expression in terms of *r*.

There are _____*6r*_____ children altogether.

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19. The product of *e* and 12. _____

20. The product of 74 and *h*. _____

21. There are 10 cartons of apples. Each carton contains *n* apples. How many apples are there altogether?

?
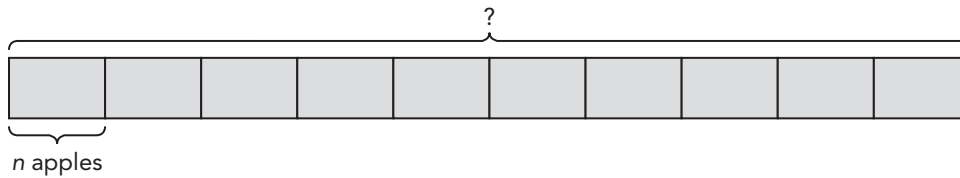
n apples

There are _____ apples altogether.

22. Ramsey has 4 bags of muffins. Each bag contains *q* muffins. How many muffins are there altogether?
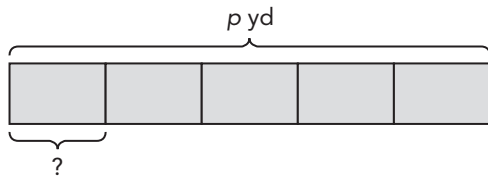
_____ muffins

23. Paul takes *k* photographs every day. What is the total number of photographs Paul takes in 5 days?

_____ photographs

Name: _____   Date: _____

Write an algebraic expression for each of the following.

> **Example**
>
> A string that is *p* yards in length is cut into 5 equal pieces. How long is each piece of string?
>
> *p* yd
>
> | | | | | |
> |---|---|---|---|---|
>
> ?
>
> $\frac{p}{5}$ is an algebraic expression in terms of *p*.
>
> Each piece of string is ____ $\frac{p}{5}$ ____ yards long.

24. The quotient of *p* and 7. _____

25. The quotient of *h* and 34. _____

26. Mary spends *h* dollars equally over 3 days. How much does she spend in a day?

h dollars

?
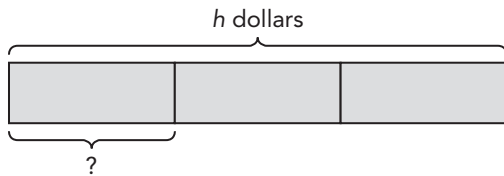
Mary spends _____ dollars in a day.

27. Ruben divided 50 cards equally into *x* boxes. How many cards are in each box?

_____ cards

28. A farmer placed 65 chickens equally into *s* chicken coops. How many chickens are there in each chicken coop?

_____ chickens

b) Percent increase $= \dfrac{27}{90} \times \underline{100\%}$

$= \underline{30\%}$

The percent increase in the price of the rug when Company B sold it to the customer was $\underline{30\%}$.

12. a) Decrease in the price of car from 2007 to 2008

$= \underline{\$32,000} - \underline{\$24,000}$

$= \underline{\$8,000}$

Percent decrease $= \dfrac{8,000}{32,000} \times \underline{100\%}$

$= \underline{25\%}$

The percent decrease in the price of the car from 2007 to 2008 was $\underline{25\%}$.

b) Percent decrease $= \dfrac{3,000}{24,000} \times \underline{100\%}$

$= \underline{12.5\%}$

The percent decrease in the price of the car from 2008 to 2009 was $\underline{12.5\%}$.

13. a) 15% **b)** 25%

14. a) 20% **b)** 25%

15. a) Number of cards Max has at first

$= \dfrac{5}{8} \times \underline{2,400}$ cards

$= \underline{1,500}$ cards

$\underline{100\%} \to \underline{1,500}$ cards

$\underline{1\%} \to \underline{1,500} \div \underline{100} = \underline{15}$ cards

$\underline{10\%} \to \underline{10} \times \underline{15}$ cards $= \underline{150}$ cards

The increase in the number of cards that Max has is $\underline{150}$.

16. $90

Chapter 7

Lesson 7.1

1.
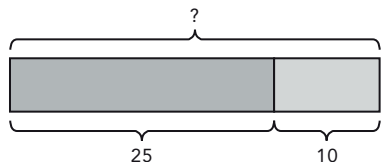
2.
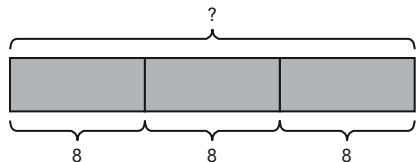
3.

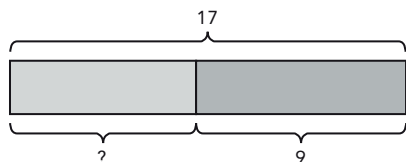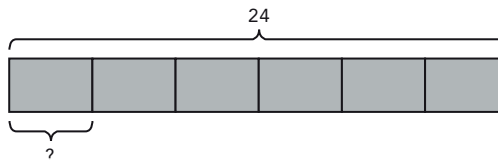**4.**

5. The <u>quotient</u> of 8 and 15 is $\dfrac{8}{15}$. 8 is the <u>dividend</u> and 15 is the <u>divisor</u>.

6. sum **7.** difference

8. product **9.** $7 + j$

10. $m + 10$ **11.** $9 + x$

12. $3 + p$

13. a) $y + 2$ **b)** $y + 7$

14. $53 - a$ **15.** $r - 50$

16. $130 - b$ **17.** $60 - t$

18. a) $m - 5$ **b)** $m - 11$

19. $12e$ **20.** $74h$

21. $10n$ **22.** $4q$

23. $5k$ **24.** $\dfrac{p}{7}$

25. $\dfrac{h}{34}$ **26.** $\dfrac{h}{3}$

27. $\dfrac{50}{x}$ **28.** $\dfrac{65}{s}$

Lesson 7.2

1. $z - 13 = \underline{20} - 13$

$= \underline{7}$

2. $3m + 2 = 3 \cdot \underline{5} + 2$

$= \underline{15} + 2$

$= \underline{17}$

3. $40 - 5p = 40 - 5 \cdot \underline{6}$

$= 40 - \underline{30}$

$= \underline{10}$

4. $\dfrac{2d}{9} = \dfrac{2 \cdot \boxed{3}}{9}$

$= \dfrac{\boxed{6}}{9}$

$= \dfrac{2}{3}$

5. 2 **6.** 5

7. 10 **8.** $\dfrac{3}{5}$

9. 14 **10.** $2\dfrac{2}{3}$

11. $1\dfrac{3}{5}$ **12.** 2

13. 22 **14.** 9

15. 42 **16.** $\dfrac{1}{2}$