TESTS FOR DIVISIBILITY

A number is divisible by ...
  2 if the last digit is even.
  4 if the last two digits can be divided by 4.
  8 if the last three digits can be divided by 8.

  5 if the last digit is 0 or 5.
 10 if the last digit is 0.

  3 if the **sum of the digits** can be divided by 3.
  6 if the number can be divided by 2 **and** by 3.
  9 if the **sum of the digits** can be divided by 9.

A number ending in ...
  one zero is divisible by 2.
  two zeros is divisible by 2 and 4.
  three zeros is divisible by 2, 4, and 8. .

Example 4 Which whole numbers from 1 to 10 are divisors of 9060?

Solution In the sense used in this problem, a **divisor** is a **factor.** The number 1 is a divisor of any whole number. As we apply the tests for divisibility, we find that 9060 passes the tests for 2, 4, 5, and 10, but not for 8. The sum of its digits (9 + 0 + 6 + 0) is 15, which can be divided by 3 but not by 9. Since 9060 is divisible by both 2 and 3, it is also divisible by 6. The only whole number from 1 to 10 we have not tried is 7, for which we have no simple test. We divide 9060 by 7 to find that 7 is not a divisor. We find that the numbers from 1 to 10 that are divisors of 9060 are **1, 2, 3, 4, 5, 6,** and **10.**

LESSON PRACTICE

Practice set* List the whole numbers that are factors of each number:

  a. 25   b. 24   c. 23

List the whole numbers from 1 to 10 that are factors of each number:

  d. 1260   e. 73,500   f. 3600

  g. List the single-digit divisors of 1356.

  h. The number 7000 is divisible by which single-digit numbers?

    i. List all the common factors of 12 and 20.

    j. Find the greatest common factor (GCF) of 24 and 40.

MIXED PRACTICE

Problem set

1. If the product of 10 and 20 is divided by the sum of 20
(1) and 30, what is the quotient?

2. (a) List all the common factors of 30 and 40.
(6)
    (b) Find the greatest common factor of 30 and 40.

3. Use braces, an ellipsis, and digits to illustrate the set of
(4) negative odd numbers.

4. Use digits to write four hundred seven million, six
(5) thousand, nine hundred sixty-two.

5. List the whole numbers from 1 to 10 that are divisors of
(6) 12,300.

6. Replace the circle with the proper comparison symbol.
(4) Then write the comparison as a complete sentence using
words to write the numbers.

$$-7 \bigcirc -11$$

7. The number 3456 is divisible by which single-digit
(6) numbers?

8. Show this subtraction problem on a number line: $2 - 5$
(4)

9. Write 6400 in expanded notation.
(5)

Find each missing number:

10. $x + \$4.60 = \$10.00$
(3)

11. $p - 3850 = 4500$
(3)

12. $8z = \$50.00$
(3)

13.
(3)

$$\begin{array}{r} 7 \\ 4 \\ 8 \\ 6 \\ 2 \\ 1 \\ 6 \\ 8 \\ 9 \\ + n \\ \hline 60 \end{array}$$

14. $1426 - k = 87$
(3)

15. $\dfrac{990}{p} = 45$
(3)

16. $\dfrac{z}{8} = 32$
(3)

Simplify:

17. $\dfrac{1225}{35}$
(1)

18. $\begin{array}{r} 800 \\ \times\ 50 \\ \hline \end{array}$
(1)

19. $\begin{array}{r} \$100.00 \\ -\ \$48.37 \\ \hline \end{array}$
(1)

20. $\begin{array}{r} 46,302 \\ +\ 49,998 \\ \hline \end{array}$
(1)

21. $\$45.00 \div 20$
(1)

22. $7 \cdot 11 \cdot 13$
(1)

23. $9\overline{)43,271}$
(1)

24. $3625 + 59 + 570 + 8$
(1)

25. $48¢ + \$8.49 + \$14$
(1)

26. $1000 - (430 - 58)$
(2)

27. $140(16)$
(1)

28. $\begin{array}{r} 25¢ \\ \times\ 24 \\ \hline \end{array}$
(1)

29. $\dfrac{\$43.50}{10}$
(1)

30. Name the property illustrated by this equation, and
(2) describe the meaning of the property.

$$x \cdot 5 = 5x$$

On earth we refer to objects aligned with the force of gravity as **vertical** and objects aligned with the horizon as **horizontal**.

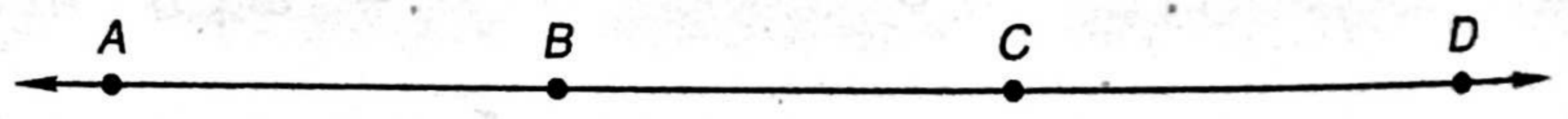**Example 5** A power pole with two cross pieces can be represented by three segments.

(a) Name a vertical segment.

(b) Name a horizontal segment.
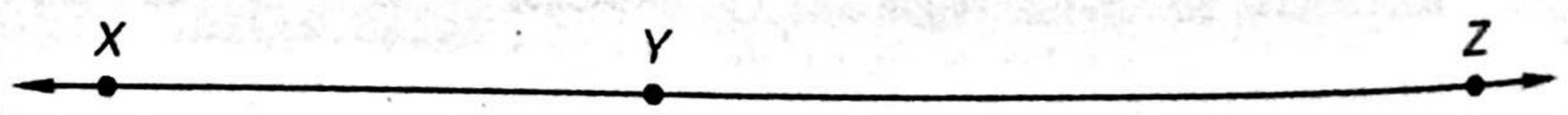
(c) Name a segment perpendicular to $\overline{CD}$.
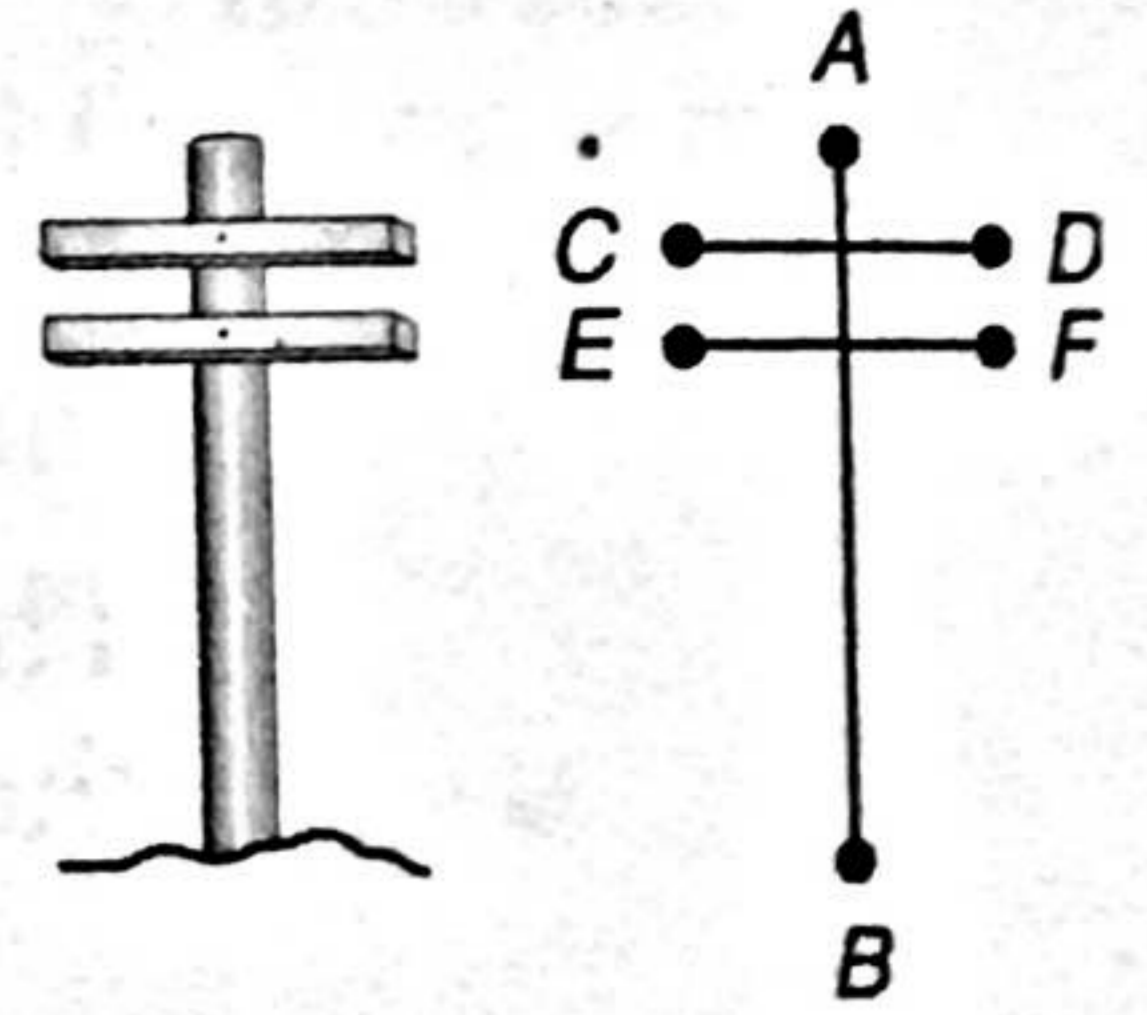
Solution (a) $\overline{AB}$ (or $\overline{BA}$)

(b) $\overline{CD}$ (or $\overline{DC}$) or $\overline{EF}$ (or $\overline{FE}$)

(c) $\overline{AB}$ (or $\overline{BA}$)

LESSON PRACTICE

Practice set **a.** Name a point on this figure that is not on ray *BC*:

b. In this figure *XZ* is 10 cm, and *YZ* is 6 cm. Find *XY*.

c. Draw two parallel lines.

d. Draw two perpendicular lines.

e. Draw two lines that intersect but are not perpendicular. What word describes the relationship of these lines?

f. Draw a right angle.

g. Draw an acute angle.

h. Draw an obtuse angle.

i. Two intersecting segments are drawn on the board. One segment is vertical and the other is horizontal. Are the segments parallel or perpendicular?

MIXED PRACTICE

Problem set

1. If the product of two one-digit whole numbers is 35, what
(3) is the sum of the same two numbers?

2. Name the property illustrated by this equation:
(2)

$$-5 \cdot 1 = -5$$

3. List the whole number divisors of 50.
(6)

4. Use digits and symbols to write "Two minus five equals
(4) negative three."

5. Use only digits and commas to write 90 million.
(5)

6. List the single-digit factors of 924.
(6)

7. Arrange these numbers in order from least to greatest:
(4)

$$-10, 5, -7, 8, 0, -2$$

8. Use words to describe the following sequence. Then find
(2) the next three numbers in the sequence.

$$\ldots, 49, 64, 81, 100, \ldots$$

9. To build a fence, Megan dug holes
(7) in the ground to hold the posts
upright. Then she nailed rails to
connect the posts. Which fence
parts were vertical, the posts or the
rails?
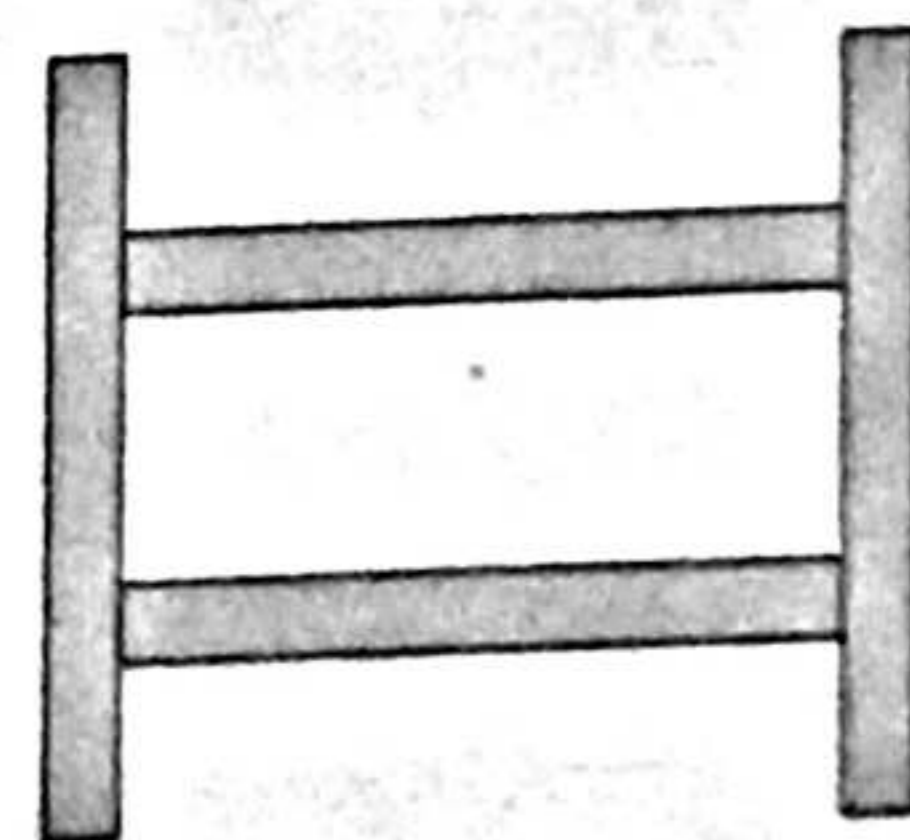
10. (a) List the common factors of 24 and 32.
(6)
(b) Find the greatest common factor of 24 and 32.

11. How many units is it from 3 to −4 on a number line?
(4)

Find each missing number:

12. $6 \cdot 6 \cdot z = 1224$
(3)

13. $\$100.00 - k = \$17.54$
(3)

14. $w - 98 = 432$
(3)

15. $20x = \$36.00$
(3)

16. $\frac{w}{20} = 200$
(3)

17. $\frac{300}{x} = 30$
(3)

18. Does the quotient of 4554 ÷ 9 have a remainder? How
(6) can you tell without dividing?

Simplify:

19.   36,475
(1) + 55,984

20.   476
(1) × 38

21. $80.00 − $72.45
(1)

22. 49 + 387 + 1579 + 98
(1)

23. $68.00 ÷ 40
(1)

24. 8 · 7 · 5
(1)

25. Compare: 4000 ÷ (200 ÷ 10) ◯ (4000 ÷ 200) ÷ 10
(2, 4)

26. Evaluate each expression for $a = 200$ and $b = 400$:
(1)

   (a) ab (b) $a - b$ (c) $\frac{b}{a}$

27. Refer to the figure at right to
(7) answer (a) and (b).

   (a) Which angle is an acute angle?

   (b) Which angle is a straight angle?
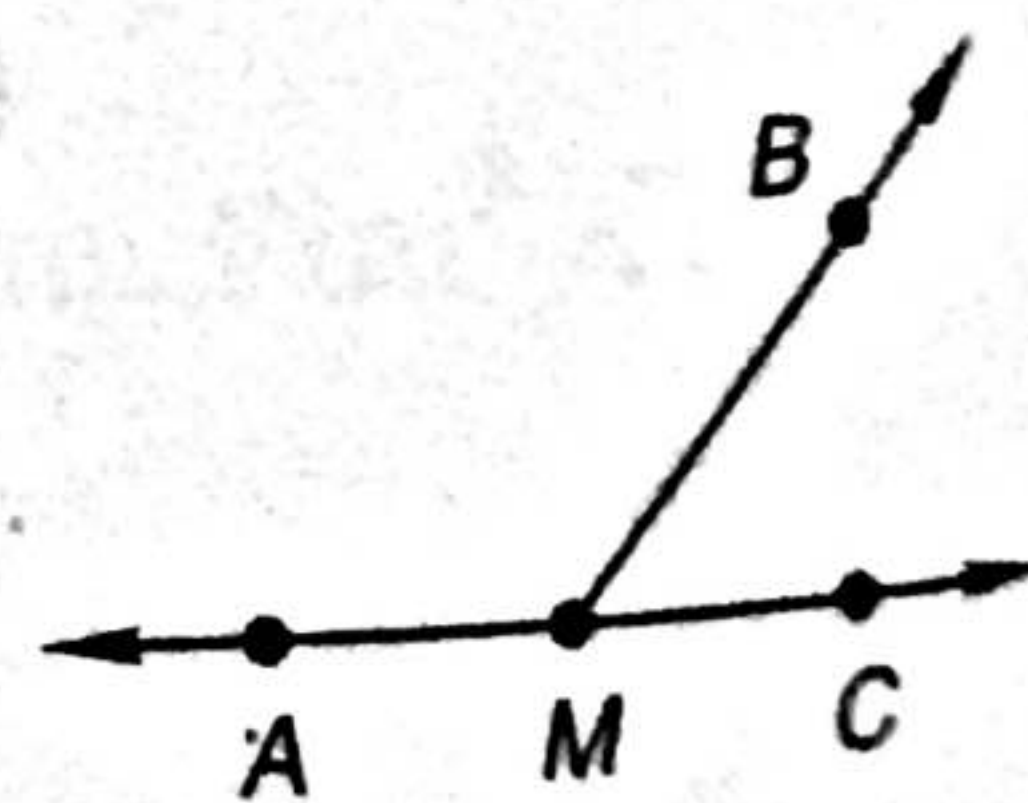
**28.** What type of angle is formed by perpendicular lines?
(7)

Refer to the figure below to answer problems 29 and 30.
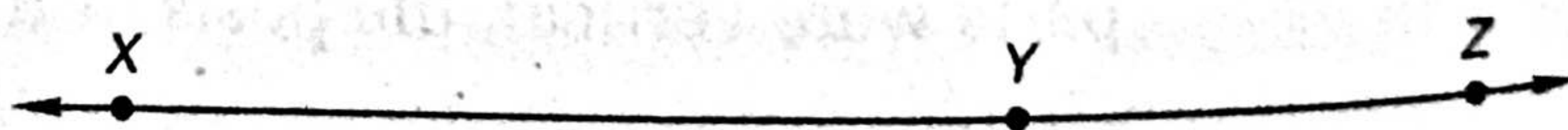
29. Name three segments in this figure.
(7)

30. If you knew m$\overline{XY}$ and m$\overline{YZ}$, describe how you would
(7) find m$\overline{XZ}$.

measures are precise to the nearest quarter inch. The greatest possible error due to the measuring instrument is one eighth of an inch, which is half of the unit used for the measure.
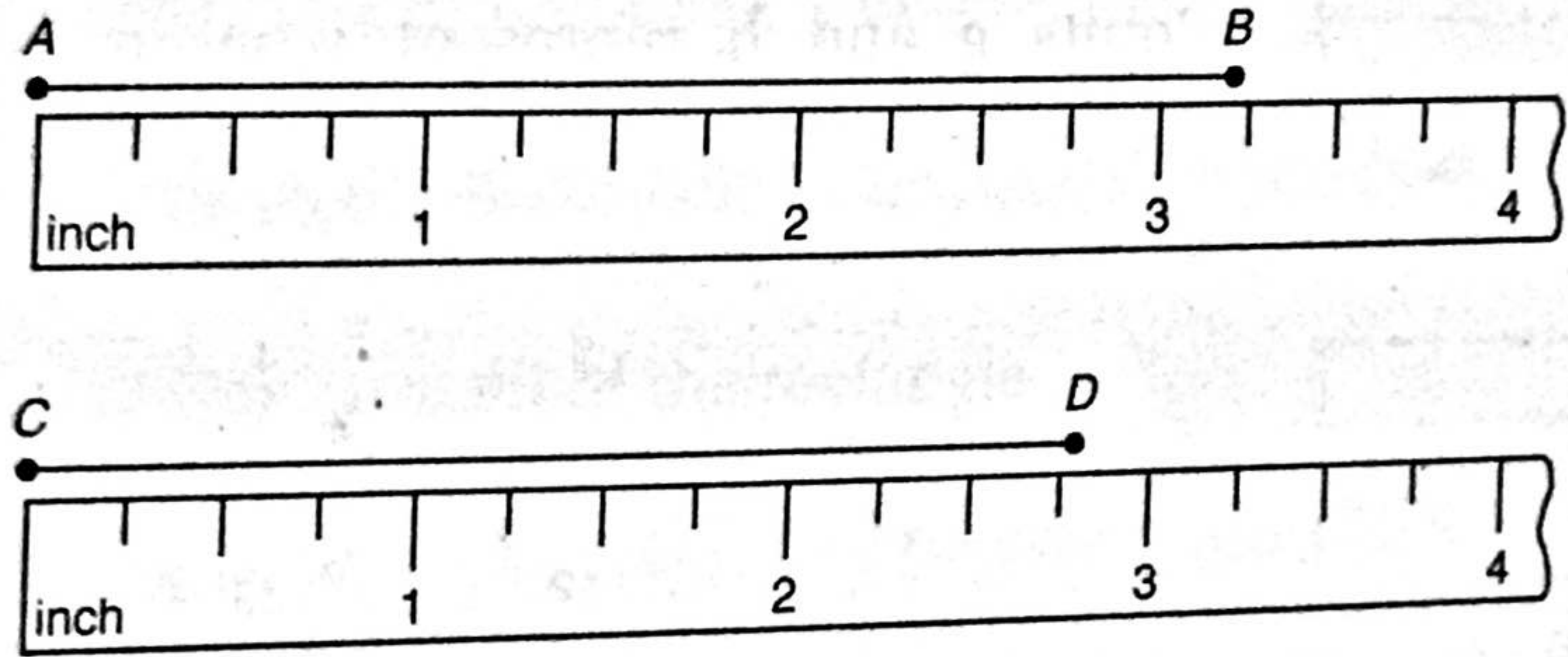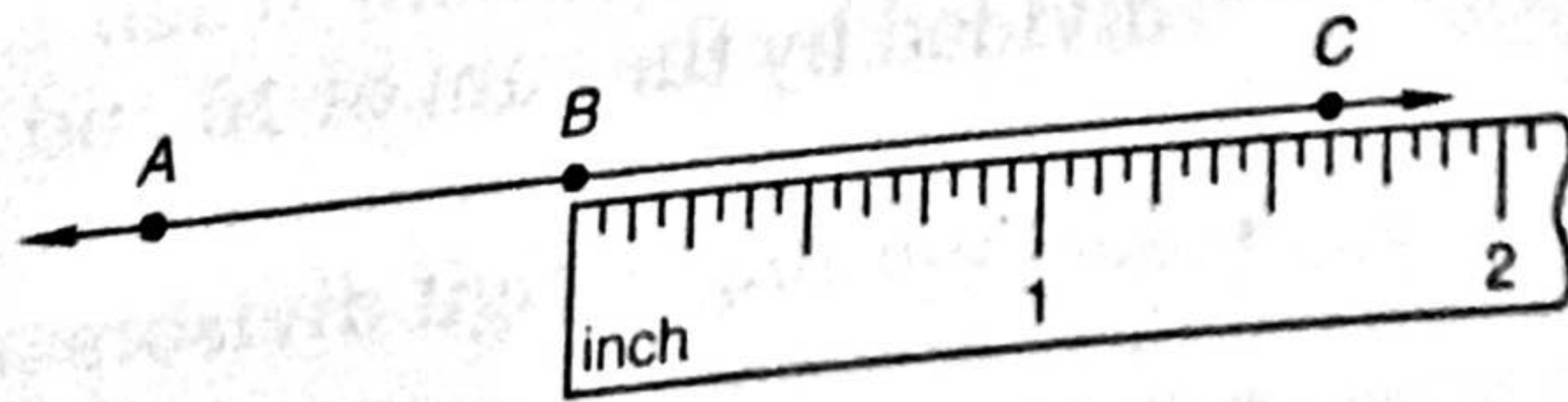

Example 4 Use an inch ruler to find AB, BC, and AC to the nearest sixteenth of an inch.
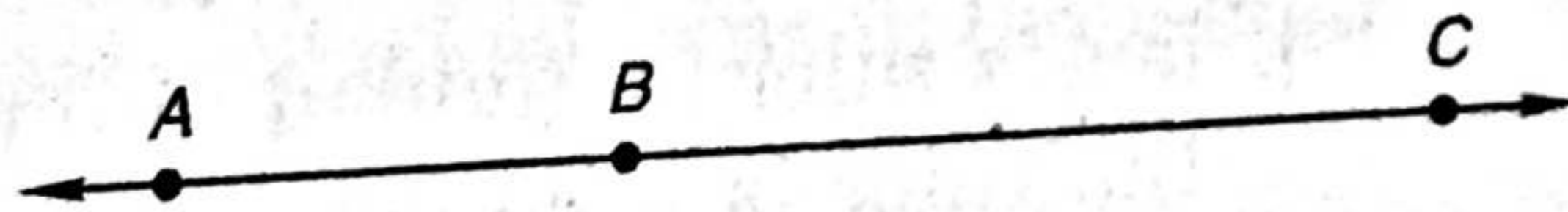
Solution From point A we find AB and AC. We measure from the center of one dot to the center of the other dot. AB is about $\frac{7}{8}$ inches, and AC is about $2\frac{1}{2}$ inches.
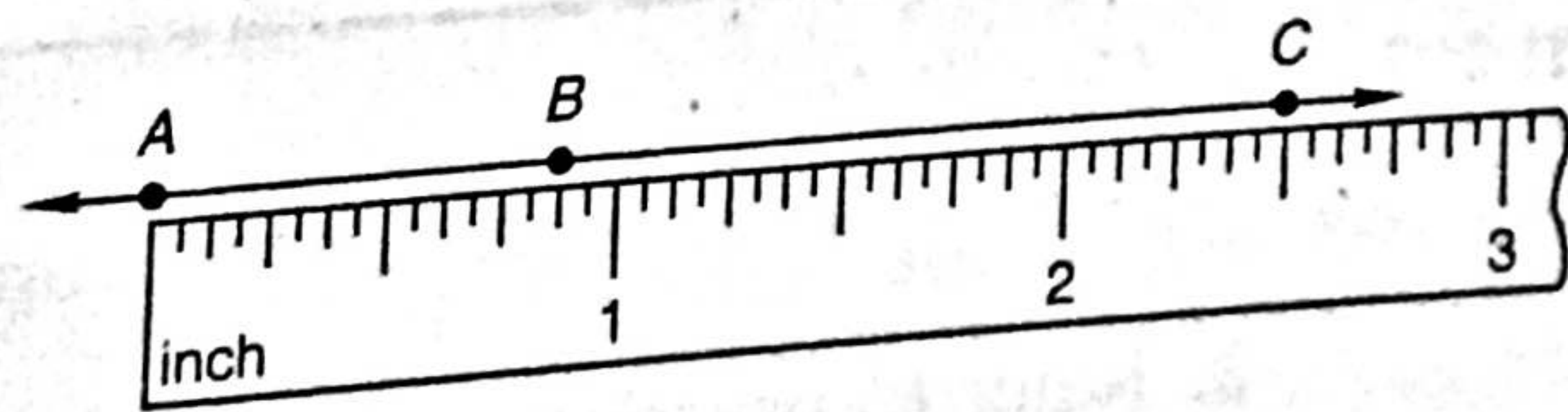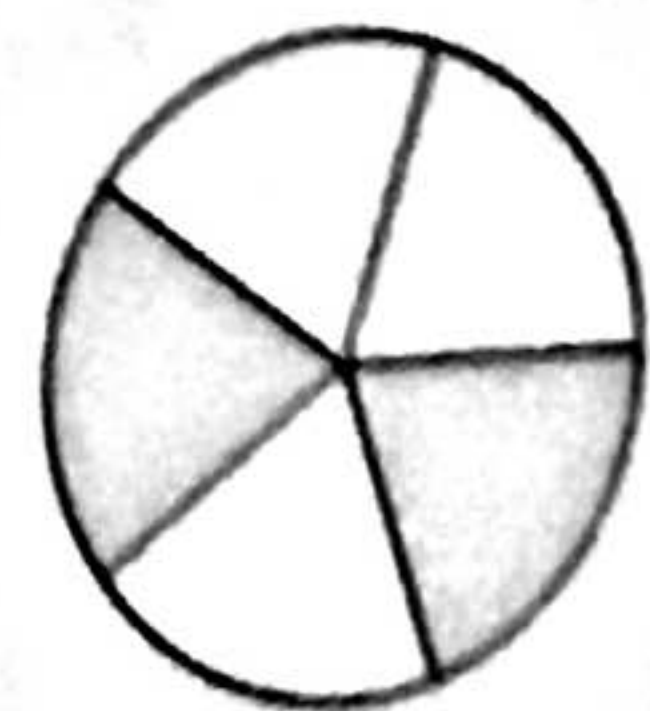

We move the zero mark on the ruler to point B to measure BC. We find BC is about $1\frac{5}{8}$ inches.

LESSON PRACTICE

Practice set **a.** What fraction of this circle is not shaded?

b. What percent of this circle is not shaded?
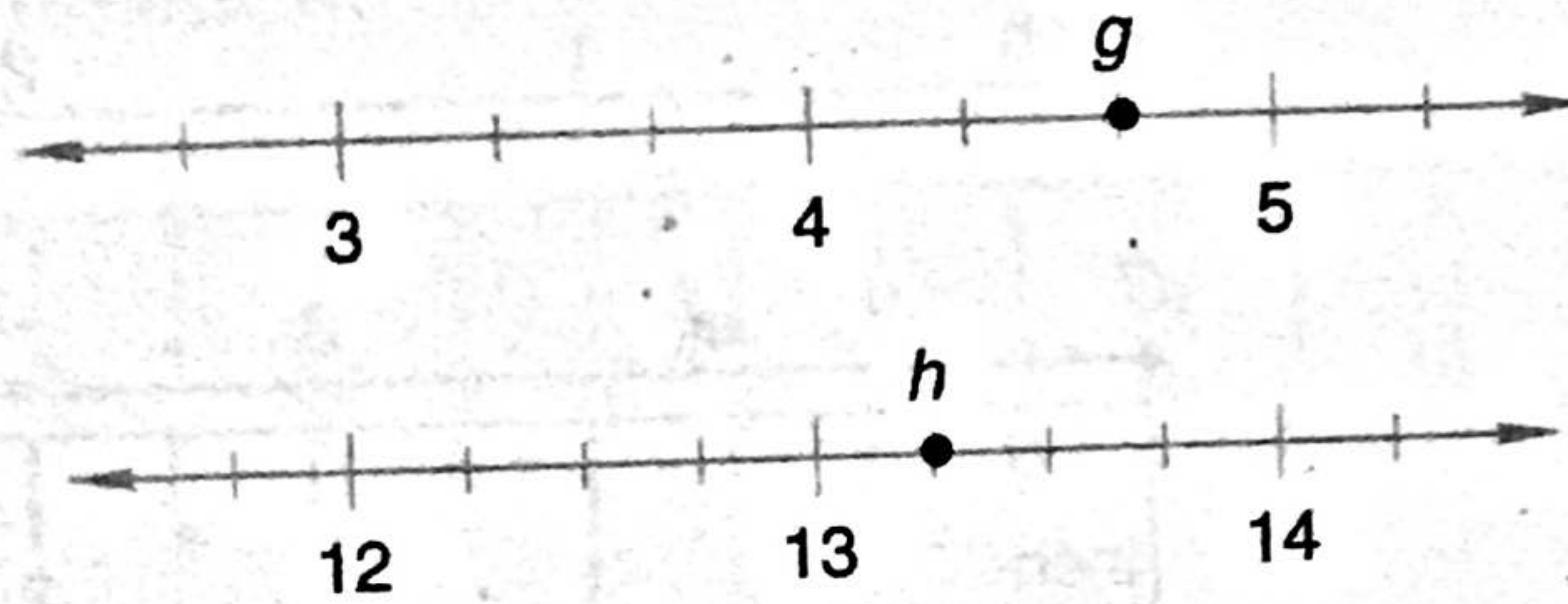
c. Half of a whole is what percent of the whole?

Draw and shade circles to illustrate each fraction, mixed number, or percent:
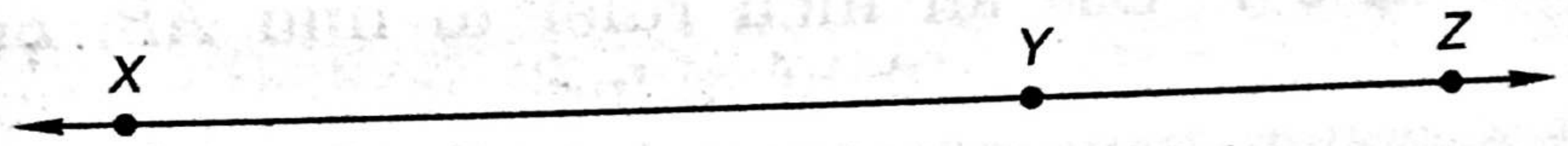
d. $\frac{2}{3}$ **e.** 75%   **f.** $2\frac{3}{4}$

Points **g** and **h** represent what mixed numbers on these number lines?

i. Find *XZ* to the nearest sixteenth of an inch.

j. Jack's ruler is divided into eighths of an inch. Assuming the ruler is used correctly, what is the greatest possible measurement error that can be made with Jack's ruler? Express your answer as a fraction of an inch.

MIXED PRACTICE

Problem set

1. Use digits and a comparison symbol to write "One and three fourths is greater than one and three fifths."
(4, 8)

2. Refer to practice problem **i** above. Use a ruler to find *XY* and *YZ*.
(8)

3. What is the quotient when the product of 20 and 20 is divided by the sum of 10 and 10?
(1)

4. List the single-digit divisors of 1680.
(6)

5. Point *A* represents what mixed number on this number line?
(8)
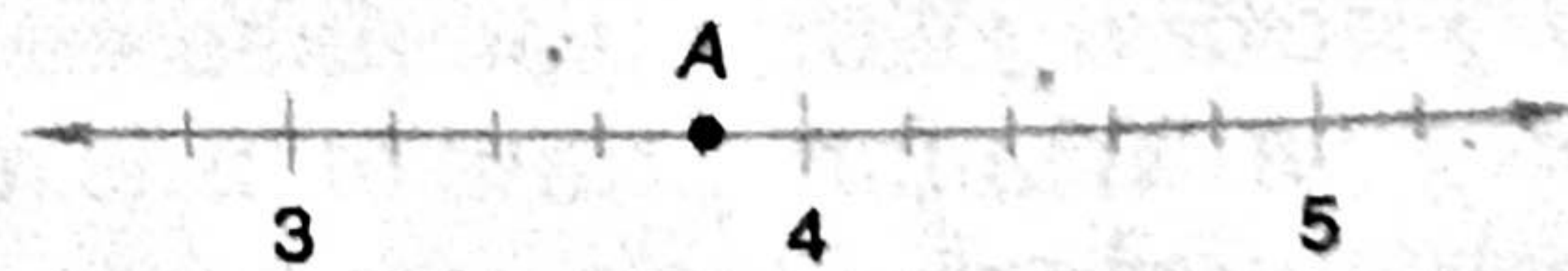
6. (a) Replace the circle with the proper comparison symbol.
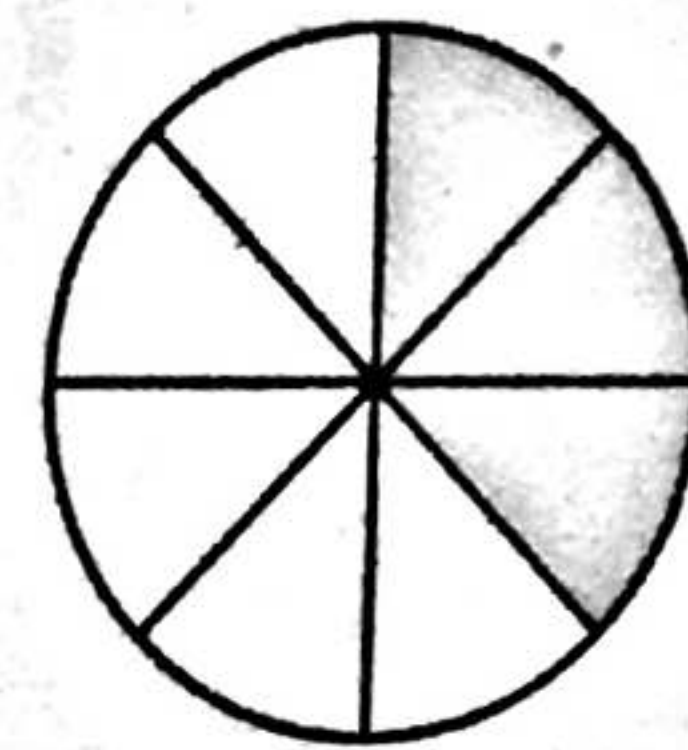(2, 4)

$$3 + 2 \bigcirc 2 + 3$$

(b) What property of addition is illustrated by this comparison?

7. Use words to write 32500000000.
(5)

8. (a) What fraction of the circle is
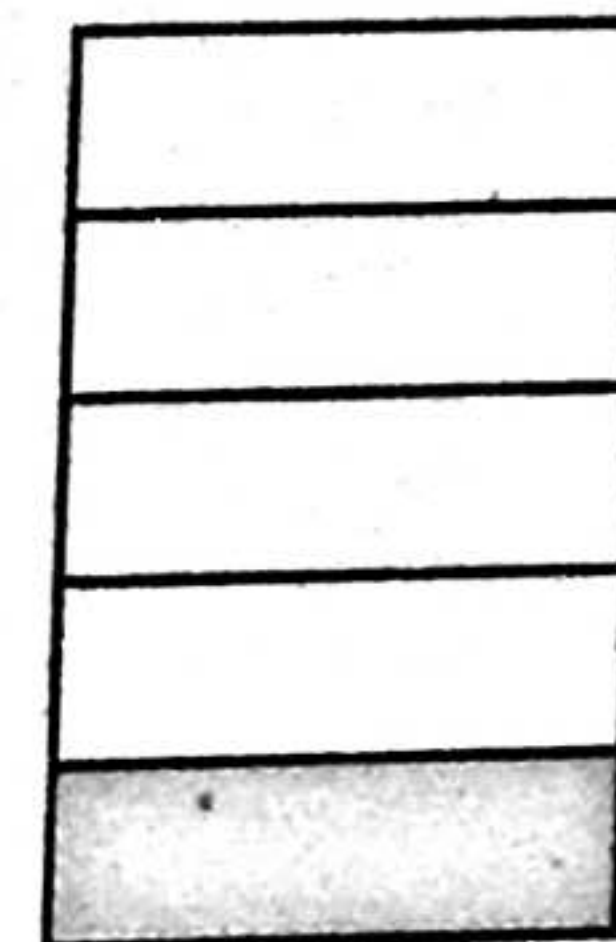(8)   shaded?

(b) What fraction of the circle is
   not shaded?

9. (a) What percent of the rectangle is
(8)   shaded?

(b) What percent of the rectangle is
   not shaded?

10. What is the name of the part of a fraction that indicates
(8) the number of equal parts in the whole?

Find each missing number:

11. $a - \$4.70 = \$2.35$
(3)

12. $b + \$25.48 = \$60.00$
(3)

13. $8c = \$60.00$
(3)

14. $10,000 - d = 5420$
(3)

15. $\dfrac{e}{15} = 15$
(3)

16. $\dfrac{196}{f} = 14$
(3)

17. $8 + 9 + 8 + 8 + 9 + 8 + n = 60$
(3)

Simplify:

18. $\begin{array}{r} 400 \\ \times\ 500 \\ \hline \end{array}$
(1)

19. $\begin{array}{r} 79¢ \\ \times\ 30 \\ \hline \end{array}$
(1)

20. $3625 + 431 + 687$
(1)

21. $6000 \div 50$
(1)

22. $20 \cdot 10 \cdot 5$
(1)

23. $\dfrac{\$27.00}{18}$
(1)

24. $\dfrac{3456}{6}$
(1)

25. If t is 1000 and v is 11, find
(1)

(a) $t - v$

(b) $v - t$

26. The rule of the following sequence is $k = 3n - 1$. What
(2) is the tenth term of the sequence?

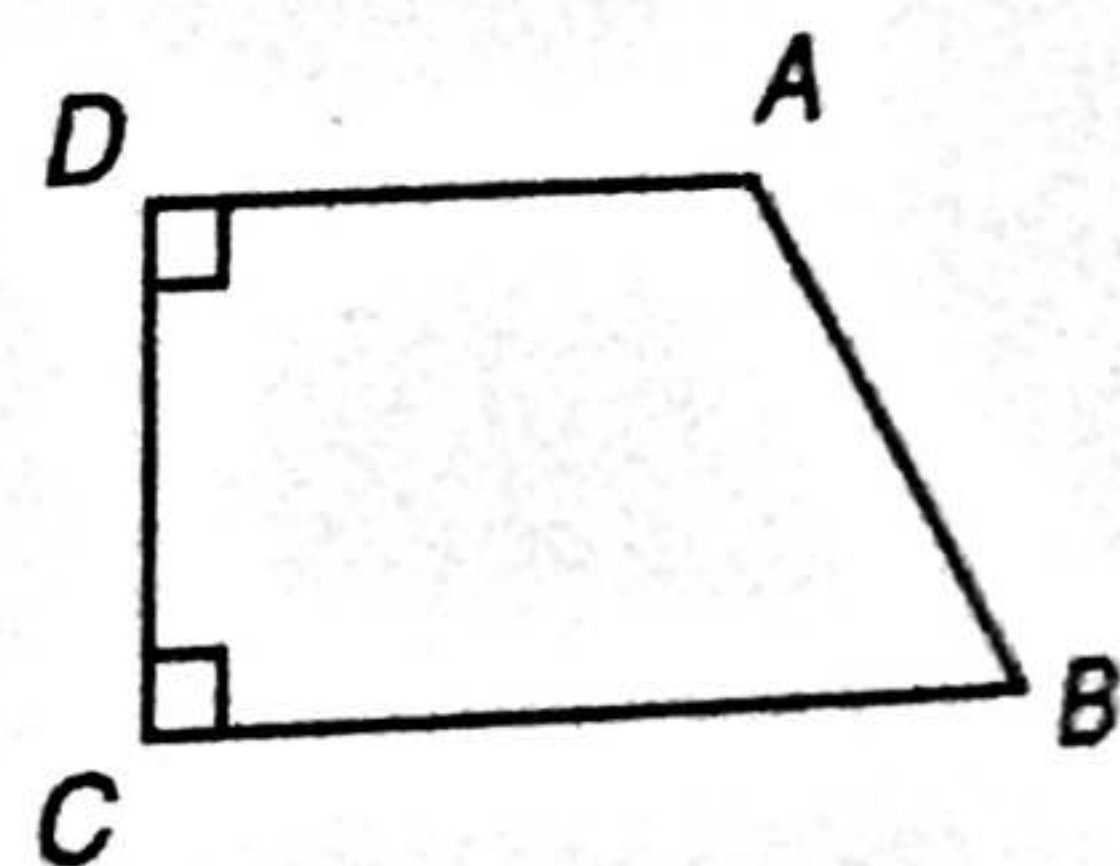$$2, 5, 8, 11, \ldots .$$

27. Compare: $416 - (86 + 119) \bigcirc (416 - 86) + 119$
(2, 4)

Refer to the figure at right to answer
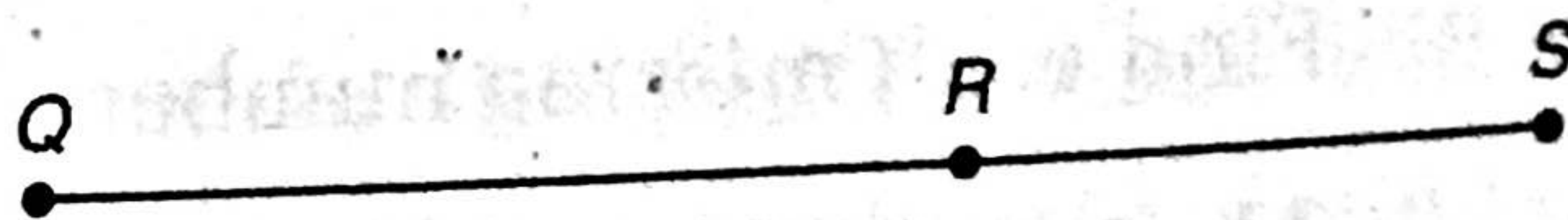problems 28 and 29.

28. Name the acute, obtuse, and right
(7) angles.

29. (a) Name a segment parallel to $\overline{DA}$.
(7)
    (b) Name a segment perpendicular to $\overline{DA}$.

30. Referring to the figure below, what is the difference in
(7) meaning between the notations $\overline{QR}$ and QR?

LESSON PRACTICE

Practice set　Follow the four-step method shown in this lesson for each problem. Along with each answer, include the equation you used to solve the problem.

a. Billy stood on the scales. Billy weighed 118 pounds. Then both Lola and Billy stood on the scales. Together they weighed 230 pounds. How much did Lola weigh?

b. Lamar cranked for a number of turns. Then Lurdes gave the crank 216 turns. If the total number of turns was 400, how many turns did Lamar give the crank?

c. At dawn 254 horses were in the corral. Later that morning Tex found the gate open and saw that only 126 horses remained. How many horses got away?

d. Cynthia had a lot of paper. After using 36 sheets for a report, only 164 sheets remained. How many sheets of paper did she have at first?

e. Write a story problem about combining that fits this equation:

$$\$15.00 + T = \$16.13$$

f. Write a story problem about separating that fits this equation:

$$32 - S = 25$$

MIXED PRACTICE

Problem set　**1.** As the day of the festival drew near, there were 200,000
(11)　people in the city. If the usual population of the city was 85,000, how many visitors had come to the city?

2. Syd returned from the store with $12.47. He had spent
(11)　$98.03 on groceries. How much money did he have when he went to the store?

3. Exactly 10,000 runners began the marathon. If only 5420
(11)　runners finished the marathon, how many dropped out along the way?