

4. b. Decrease, because the four books average price was \$4.58 and this book is less than the average, so it would bring the average price down.

1. **a.** How many boys are in the class? **16 boys**
(38)
- b.** How many girls are in the class? **16 girls**
2. **a.** What percent of the students have a birthday in one of the months from January through June? **50%**
(38)
3. **a.** What fraction of the boys have a birthday in one of the months from April through June? $\frac{5}{16}$
(38)
4. **a.** At the book fair Muhammad bought 4 books. One book cost \$3.95. Another book cost \$4.47. The other 2 books cost \$4.95 each. What was the average price per book? **\$4.58 per book**
(28)
- ▶ **b.** **Predict** If Muhammed bought another book for \$4.25, would you expect the average price per book to increase or decrease? Explain your reasoning?
5. Read the following and answer the questions that follow.
(22)
Seven twelfths of the 840 students attended the Spring Concert.
 - a.** What fraction of the students did not attend the Spring Concert? $\frac{5}{12}$
 - b.** How many students did not attend the Spring Concert? **350 students**
- ▶ * 6. **a.** Write one trillion in scientific notation. 1×10^{12}
(51)
- b.** **Represent** Write 475,000 in scientific notation. 4.75×10^5
- * 7. **a.** Write 7×10^2 in standard form. **700**
(51)
- ▶ **b.** **Conclude** Compare: $2.5 \times 10^6 > 2.5 \times 10^5$
- ▶ * 8. **Connect** Use unit multipliers to perform the following conversions:
(50)
 - a.** 35 yards to feet (3 ft = 1 yd) $35 \text{ yd} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} = 105 \text{ ft}$
 - b.** 2000 cm to m (100 cm = 1 m) $2000 \text{ cm} \cdot \frac{1 \text{ m}}{100 \text{ cm}} = 20 \text{ m}$

- **9.** Use prime factorization to find the least common multiple of 54 and 36. **108**

- 10.** A car traveling 62 miles per hour is moving at a speed of about how many kilometers per hour? Use a unit multiplier to convert the rate.

$$(1 \text{ km} \approx 0.62 \text{ mi}) \quad \frac{62 \text{ mi}}{1 \text{ hr}} \cdot \frac{1 \text{ km}}{0.62 \text{ mi}} \approx \frac{100 \text{ km}}{1 \text{ hr}}$$

- 11.** Complete the table.

| Fraction | Decimal | Percent |
|-------------------|---------|---------|
| a. $1\frac{1}{2}$ | b. 1.5 | 150% |
| c. $\frac{3}{20}$ | d. 0.15 | 15% |

- 12.** Write each number as a percent:

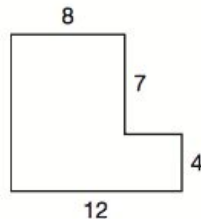
a. $\frac{4}{5}$ **80%**

b. 0.06 **6%**

- 13.** A lilac bush is 2 m tall. A rose bush is 165 cm tall. The lilac bush is how many centimeters taller than the rose bush? **35 cm**

- 14.** Refer to this figure to answer **a** and **b**.
Dimensions are in feet. All angles are right angles.

- **a.** What is the area of the figure? **104 ft²**
- b.** What is the perimeter of the figure? **46 ft**



- * **15.** **Analyze** In the school Marching Band the ratio of trumpet players to drummers was 5 to 2. If there were six drummers in the Marching Band, how many trumpet players were there? **15 trumpet players**

Solve:

16. $\frac{18}{100} = \frac{90}{p}$ 500
(39)

17. $\frac{6}{9} = \frac{t}{1.5}$ 1
(39)

18. $8 = 7.25 + m$ 0.75
(35)

19. $1.5 = 10n$ 0.15
(35)

Simplify:

▶ 20. $\sqrt{81} + 9^2 - 2^5$ 58
(20)

▶ 21. $16 \div 4 \div 2 + 3 \times 4$ 14
(52)

* 22. $3 \text{ yd } 1 \text{ ft } 7\frac{1}{2} \text{ in.}$
(49)

▶ 23. $12\frac{2}{3} + \left(5\frac{5}{6} \div 2\frac{1}{3}\right)$ $15\frac{1}{6}$
(26, 30)

+ $2 \text{ ft } 6\frac{1}{2} \text{ in.}$

 $4 \text{ yd } 1 \text{ ft } 2 \text{ in.}$

24. $8\frac{3}{5} - \left(1\frac{1}{2} \cdot 3\frac{1}{5}\right)$ $3\frac{4}{5}$
(26, 30)

* 25. Analyze $10.6 + 4.2 + 16.4 + (3.875 \times 10^1)$ 69.95
(35, 47)

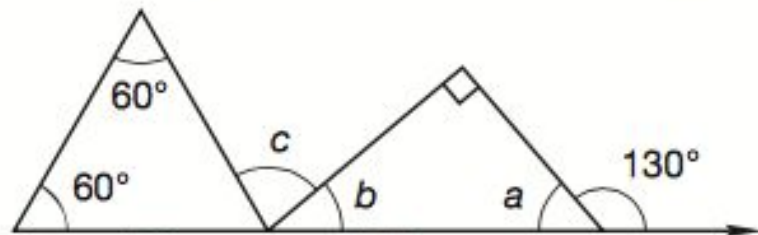
26. Estimate: $6.85 \times 4\frac{1}{16}$ 28
(29, 33)

►* **27.** **Conclude** Find the value of $\frac{ab}{bc}$ when $a = 6$, $b = 0.9$, and $c = 5$. **1.2**
(52)

►* **28.** **Analyze** Petersen needed to pack 1000 eggs into flats that held $2\frac{1}{2}$ dozen eggs. How many flats could he fill? **33 flats**
(44)

29. If there is one chance in five of picking a red marble, then what is the probability of not picking a red marble? Write the probability as a fraction and as a decimal. **$P(\text{not red}) = \frac{4}{5} = 0.8$**
(14, 43)

► **30.** Find the measures of angles a , b , and c in this figure:
(40)



$m\angle a = 50^\circ$; $m\angle b = 40^\circ$; $m\angle c = 80^\circ$

facts**mental
math**

Power Up L

a. Calculation: $4 \times \$4.50$

b. Decimals: $12.75 \div 10$

c. Equivalent Fractions: $\frac{12}{w} = \frac{9}{6}$

d. Measurement: Convert 1.5 m to cm.

e. Power/Roots: $\sqrt{900} - 3^3$

f. Fractional Parts: $\frac{3}{10}$ of 90

g. Probability: How many different ways can you arrange the digits 9, 4, 3, 7, 2?

h. Calculation: Mentally perform each calculation:

$$\frac{3}{4} + \frac{2}{5}$$

$$\frac{3}{4} - \frac{2}{5}$$

$$\frac{3}{4} \cdot \frac{2}{5}$$

$$\frac{3}{4} \div \frac{2}{5}$$

facts

Power Up L

**mental
math****a. Calculation:** $4 \times \$4.50$ **\$18.00****b. Decimals:** $12.75 \div 10$ **1.275** *1.275***c. Equivalent Fractions:** $\frac{12}{w} = \frac{9}{6}$ **8****d. Measurement:** Convert 1.5 m to cm. **150 cm****e. Power/Roots:** $\sqrt{900} - 3^3$ **3****f. Fractional Parts:** $\frac{3}{10}$ of 90 **27****g. Probability:** How many different ways can you arrange the digits 9, 4, 3, 7, 2? **120****h. Calculation:** Mentally perform each calculation: **$1\frac{3}{20}$, $\frac{7}{20}$, $\frac{3}{10}$, $1\frac{7}{8}$**

$$\frac{3}{4} + \frac{2}{5}$$

$$\frac{3}{4} - \frac{2}{5}$$

$$\frac{3}{4} \cdot \frac{2}{5}$$

$$\frac{3}{4} \div \frac{2}{5}$$

Facts

Write the equivalent decimal and percent for each fraction.

| Fraction | Decimal | Percent |
|---------------|---------|---------|
| $\frac{1}{2}$ | | |
| $\frac{1}{3}$ | | |
| $\frac{2}{3}$ | | |
| $\frac{1}{4}$ | | |
| $\frac{3}{4}$ | | |
| $\frac{1}{5}$ | | |

| Fraction | Decimal | Percent |
|-----------------|---------|---------|
| $\frac{1}{8}$ | | |
| $\frac{1}{10}$ | | |
| $\frac{3}{10}$ | | |
| $\frac{9}{10}$ | | |
| $\frac{1}{100}$ | | |
| $1\frac{1}{2}$ | | |

Facts

Write the equivalent decimal and percent for each fraction.

| Fraction | Decimal | Percent | Fraction | Decimal | Percent |
|-----------------------------------|-------------|-------------------|-----------------|---------|-------------------|
| $\frac{1}{2}$ | 0.5 | 50% | $\frac{1}{8}$ | 0.125 | $12\frac{1}{2}\%$ |
| $\frac{1}{3}$ | $0.\bar{3}$ | $33\frac{1}{3}\%$ | $\frac{1}{10}$ | 0.1 | 10% |
| $\frac{2}{3}$ | $0.\bar{6}$ | $66\frac{2}{3}\%$ | $\frac{3}{10}$ | 0.3 | 30% |
| $\frac{1}{4}$ | 0.25 | 25% | $\frac{9}{10}$ | 0.9 | 90% |
| $\frac{3}{4}$ | 0.75 | 75% | $\frac{1}{100}$ | 0.01 | 1% |
| $\frac{1 \times 20}{5 \times 20}$ | 0.2 | 20% | $1\frac{1}{2}$ | 1.5 | 150% |

New Concept

Ratio = Actual
count

• Rate Word Problems

- Actual measurement +

Increasing Knowledge

In Lesson 53, we solved ratio word problems by using proportions. We can solve rate word problems in the same way.

Example 1

★ Best Mistake
~~reductive~~

If Mr. Gomez drives his car at an average speed of 55 miles per hour, how far will he drive in 3 hours? 😊

$$1/4 = \frac{1}{4}$$

m = 165 miles in 3 hrs

Solution

We can make a ratio box to solve this problem.

①

| | Rate | Actual Measure |
|-------|------|----------------|
| miles | 55 | m |
| hour | 1 | 3 |

②

$$\frac{55}{1} = \frac{m}{3}$$

③

$$1 \cdot m = 55 \cdot 3$$

④

$$\frac{m}{1} = \frac{165}{1}$$

⑤

Example 2

If Mrs. Ikeda's car averages 24 miles per gallon, then about how many gallons of gas will she use on a trip of 300 miles?

$\frac{m}{g}$ ← per

| | Rates | A.M. |
|-------|-------|------|
| miles | 24 | 300 |
| gal | 1 | g |

$$\begin{array}{c} \rightarrow \\ \rightarrow \end{array} \frac{\cancel{24}}{1} \times \frac{300}{\cancel{g}}$$

$$\frac{\cancel{24}g}{\cancel{24}} = \frac{300}{24} \div \frac{3}{3} = \frac{100}{8} \div \frac{4}{4} = \frac{25}{2}$$
$$2 \overline{)25} \begin{array}{r} 12.5 \\ \underline{2} \\ 5 \\ \underline{5} \\ 0 \end{array}$$

$$g = 12.5 \text{ gal}$$

Example 3

Hana works for 8 hours at a sporting goods store and earns a total of \$68.00.

a. What is her hourly rate of pay?

\$8.50/hr

b. Use her hourly rate of pay to find how much she will earn if she works for 30 hours.

\$255.00

A

| | | |
|----|------|-------|
| | Rate | A.M. |
| \$ | X | 68.00 |
| hr | 1 | 8 |

$$\begin{array}{r} \$8.50 \\ 8 \overline{) 68.00} \\ \underline{64} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

~~$$\begin{array}{r} X \\ 1 \overline{) 68.00} \\ \underline{68} \\ 0 \end{array}$$~~

$$\frac{8X}{8} = \frac{68.00}{8}$$

B

| | | |
|----|------|----|
| | Rate | AM |
| \$ | 8.5 | X |
| hr | 1 | 30 |

$$\begin{array}{r} X \\ 8.5 \overline{) 255.00} \\ \underline{255} \\ 0 \end{array}$$

$$\frac{8.5}{1} \times \frac{X}{30} \quad | \quad X = 8.5 \cdot 30$$

Practice Set

Use a ratio box to help you solve these rate word problems.

On a 600-mile trip, Dixon's car averaged 50 miles per hour and 30 miles per gallon.

- a. The trip took how many hours to complete?
- b. During the trip the car used how many gallons of gas?

20 gallon

| | | |
|----|----|-----|
| | R | AM |
| m | 50 | 600 |
| hr | 1 | H |

$$\frac{50}{1} = \frac{600}{H}$$

mi
gal

| | | |
|-----|----|-----|
| | R | AM |
| mi | 30 | 600 |
| gal | 1 | G |

$$\frac{30}{1} = \frac{600}{G}$$

Handwritten calculations:

$$\frac{50 \text{ H} = 600}{50} = 12$$

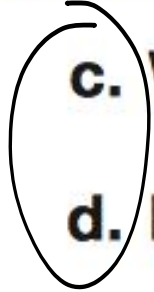
$$\frac{30 \text{ G} = 600}{30} = 20$$

H = 12 hours

Practice Set

Use a ratio box to help you solve these rate word problems.

Jenna earned \$68.80 working 8 hours. Ex. 3



c. What is Jenna's hourly rate of pay?

d. How much would Jenna earn working 20 hours?

| | | |
|----|------|------|
| | Rate | A.M. |
| \$ | | |
| hr | 1 | |

| | | |
|----|------|------|
| | Rate | A.M. |
| \$ | | |
| hr | 1 | |

Practice Set

Use a ratio box to help you solve these rate word problems.

The price of one type of cheese is \$2.60 per pound.

- e. What is the cost of a 2.5-pound package of cheese?

- f. **Explain** How could we find the cost of a half-pound package of cheese?

Practice Set

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| Rate | A.M. |
|------|------|
| | |
| | |

Practice Set

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