

Ones	Tenths	Hundredths	Thousandths
2	3	6	9

2 and 369 thousandths

- *Standard form:* 2.369
- To find the value of a digit, multiply the digit by its place value.  
9 stands for  $9 \times 0.001$  or  $0.009$
- *Expanded form:*  
 $2.369 = 2 + 0.3 + 0.06 + 0.009$

Write each decimal in expanded form.

1. 3.6

3 + .6

2. 4.72

\_\_\_\_\_

3. 1.283

1 + .2 + .08 + .003

4. 21.5

\_\_\_\_\_

5. 7.03

7 + .03

6. 15.308

\_\_\_\_\_

7. 32.27

30 + 2 + .2 + .07

8. 6.475

\_\_\_\_\_

Write each decimal in words.

9. 0.2

2 tenths

10. 0.15

\_\_\_\_\_

11. 0.29

29 hundredths

12. 0.11

\_\_\_\_\_

13. 0.60

60 hundredths

14. 0.9

\_\_\_\_\_

15. 0.50

50 hundredths

16. 0.4

\_\_\_\_\_

17. 0.37

37 hundredths

Write each decimal in standard form.

18. seven tenths

\_\_\_\_\_

19. one tenth

0.1

20. four hundredths

\_\_\_\_\_

21. seven hundredths

0.07

22. twenty-two hundredths

\_\_\_\_\_

23. forty-six hundredths

0.46

24. eighty hundredths

\_\_\_\_\_

25. thirty hundredths

0.35

26. three hundredths

\_\_\_\_\_

Find each sum or difference.

1.  $6.3 + 2.9$

9.2

2.  $18.75 - 3.99$

3.  $1.26 + 3.93$

5.19

4.  $14.72 + 35.18$

5.  $10.6 - 4.8$

5.8

6.  $5.8 + 7$

7.  $93 - 22.98$

70.02

8.  $48.87 - 31.04$

Use the order of operations to find each value.

9.  $5 \times 9 - 22.41$

22.59

10.  $68.39 - 36.8 + 28$

11.  $9 \div (3.6 - 2.1)$

6

12.  $11.2 + 4 \times 5$

13. **CHECKING ACCOUNT** Tito has a current balance of \$215.98 in his checking account. What will his balance be after he deposits a check for \$15.52?

\$231.50

14. **LUNCH** The table shows the prices 3 girls paid for lunch. How much more did Paulina spend than Nita?

Name	Amount Spent on Lunch (\$)
Paulina	6.51
Concretia	5.92
Nita	4.27

Answers may vary

### Estimate Products

Estimate each product.

(using compatible numbers)

1.  $4.7 \times 5.2$

$5 \times 5 = 25$

2.  $7.1 \times 2.1$

3.  $32.9 \times 9.8$

$33 \times 10 = 330$

4.  $72.7 \times 19.8$

5.  $25.4 \times 48.6$

6.  $29.6 \times 29.6$

$25 \times 50 = 1250$

7.  $5.2 \times 6$

$5 \times 6 = 30$

8.  $26.4 \times 3.4$

9.  $75.8 \times 12$

$75 \times 10$

$750$

10.  $8.9 \times 11$

11.  $42.4 \times 2$

12.  $16.7 \times 13.1$

$42 \times 2$   
 $84$

13.  $11.5$

$\times 58.5$

14.  $78.4$

$\times 21.5$

15.  $32.1$

$\times 18.1$

$12 \times 60 = 720$

$30 \times 20 = 600$

16. **SPEED** A car moving at 35 miles per hour travels a distance of 51.3 feet each second. About how far does the car travel in 7.1 seconds?

17. **DINING OUT** The prices for a complete meal at a local restaurant average about \$7.75 per person. About how much would a family of six expect to pay for a meal?

$8 \times 6 \approx \$48$

Use estimation to determine whether each answer is reasonable. If the answer is reasonable, write *yes*. If not, write *no* and provide a reasonable estimate.

18.  $48.6 \times 6.7 = 125.62$

19.  $3.7 \times 8.2 \times 5.5 = 166.87$

*yes*

$4 \times 8 \times 6$

$4 \times 10 \times 5 = 200$

**Multiply.**

1.  $0.3 \times 0.9$

0.27

2.  $2.6 \times 1.7$

3.  $1.09 \times 5.4$

5.886

4.  $17.2 \times 12.86$

5.  $0.56 \times 0.03$

0.0168

6.  $4.9 \times 0.02$

7.  $2.07 \times 2.008$

4.15656

8.  $26.02 \times 2.006$

9.  $4.68 \times 0.034$

0.15912

10.  $2.9 \times 4.05$

11. **MINING** A mine produces 42.5 tons of coal per hour. How much coal will the mine produce in 9.5 hours?

403.75 tons of coal

12. **SHOPPING** Ms. Morgan bought 3.5 pounds of bananas at \$0.51 a pound and 4.5 pounds of pineapple at \$1.19 a pound. How much did she pay for the bananas and pineapple?

Answers may vary

### Estimate Quotients

Estimate each quotient.

Using compatible numbers

1.  $121.6 \div 43.5$

$$\begin{array}{r} 120 \div 40 \\ 3 \end{array}$$

2.  $69.1 \div 10.7$

$$\begin{array}{r} 54 \div 9 \\ 6 \end{array}$$

3.  $38.9 \div 13.1$

$$\begin{array}{r} 39 \div 13 \\ 3 \end{array}$$

4.  $435.8 \div 88.6$

5.  $52.7 \div 9.2$

6.  $75.6 \div 15.3$

7.  $43.2 \div 3.9$

$$\begin{array}{r} 44 \div 4 \\ 11 \end{array}$$

8.  $88.8 \div 10.1$

9.  $93.6 \div 23.5$

$$\begin{array}{r} 100 \div 25 \\ 4 \end{array}$$

10.  $511.1 \div 247.3$

11.  $205.4 \div 48.6$

12.  $316.9 \div 327.5$

$$\begin{array}{r} 200 \div 50 \\ 4 \end{array}$$

13.  $11.5 \overline{)56.7}$

$$\begin{array}{r} 5 \\ 11 \overline{)55} \end{array}$$

14.  $21.8 \overline{)82.3}$

15.  $9.2 \overline{)46.8}$

$$\begin{array}{r} 5 \\ 9 \overline{)45} \end{array}$$

16. **MONEY** Mr. Briggs paid \$582.40 for a set of four tires for his truck. About how much was the cost per tire?

17. **CHECKERS** Annika bought 9 checker sets for her checkers club. She paid \$87.84 before tax. About how much did each checker set cost?

$$\$90 \div 9 = \$10$$

Use estimation to determine whether each answer is reasonable. If the answer is reasonable, write *yes*. If not, write *no* and provide a reasonable estimate.

18.  $82.1 \div 7.8 = 19.1$

19.  $769.5 \div 142.5 = 5.4$

Yes

$$750 \div 150 = 5$$

**Divide.**

1.  $12.92 \div 3.4$

3.8

2.  $22.47 \div 0.7$

3.  $0.025 \div 0.5$

0.05

4.  $7.224 \div 0.08$

5.  $0.855 \div 9.5$

6.  $0.9 \div 0.12$

0.09

7.  $3.0084 \div 0.046$

8.  $0.0868 \div 0.007$

9.  $14.43 \div 0.39$

65.4

37

10. **WHALES** After its first day of life, a baby blue whale started growing. It grew 47.075 inches. If the average baby blue whale grows at a rate of 1.5 inches a day, for how many days did the baby whale grow, to the nearest tenth of a day?

31.4 days

11. **LIZARDS** The two largest lizards in the United States are the Gila Monster and the Chuckwalla. The average Gila Monster is 0.608 meter long. The average Chuckwalla is 0.395 meter long. How many times as long is the Gila Monster as the Chuckwalla, to the nearest hundredth?

about 1.54 times

**Find each product.**

- |                                   |                                       |  |
|-----------------------------------|---------------------------------------|--|
| 1. $0.44 \times 10$ <i>4.4</i>    | 2. $7.86 \times 100$                  | 3. $93.6 \times 1$ <i>93.6</i>         |
| 4. $0.777 \times 1,000$           | 5. $25.4 \times 10$ <i>254</i>        | 6. $5.58 \times 1,000$                 |
| 7. $0.6 \times 0.01$ <i>0.006</i> | 8. $5.87 \times 0.01$                 | 9. $2.1 \times 0.1$ <i>0.21</i>        |
| 10. $53.46 \times 0.001$          | 11. $0.007 \times 0.1$ <i>0.00007</i> | 12. $781.5 \times 0.001$               |
| 13. $0.51 \times 100$ <i>51</i>   | 14. $6.113 \times 1,000$              | 15. $29.5 \times 0.01$<br><i>0.295</i> |

**Write each number in standard form.**

16. **POPULATION** In 2006, the estimated population of metropolitan Jacksonville, Florida, was 1.30 million people.

17. **SCIENCE** The planet Venus is 67.24 million miles from the Sun.

*67,240,000*

**ALGEBRA** Evaluate each expression if  $d = 10$ ,  $f = 0.01$ , and  $g = 0.1$ .

18.  $1.5f$

19.  $0.022 \times d^3$

20.  $38.4 \times g$

*0.022 \times 1000*  
*22*

21. **MONEY** Mr. and Mrs. Sanchez decided to have their daughter's wedding reception catered. The cost is \$21.60 per person. What will be the cost for a reception of 100 guests?

*\$ 2,160*

22. **ELECTRICITY** The electric company places an additional fuel charge on consumers' monthly electric bills. This charge is one hundredth of the regular charges. What is the additional fuel charge for a bill of \$162.00?

Find each quotient.

1.  $54.21 \div 1,000$

$$0.05421$$

2.  $815 \div 100$

3.  $3.123 \div 100$

$$0.03123$$

4.  $0.47 \div 1,000$

5.  $18.76 \div 0.01$

$$1876$$

6.  $233.5 \div 0.1$

7.  $0.89 \div 0.1$

$$8.9$$

8.  $7.8 \div 0.001$

9.  $1.16 \div 0.1$

$$11.6$$

10.  $96.3 \div 100$

11.  $1.7 \div 1,000$

$$0.0017$$

12.  $6.2 \div 0.01$

**ALGEBRA** Evaluate each expression if  $a = 10$ ,  $b = 0.01$ , and  $c = 0.1$ .

13.  $56 \div b$

$$56 \div 0.01$$
$$5600$$

14.  $3.8 \div a$

15.  $921 \div c$

$$921 \div 0.1$$
$$9210$$

16. **MARATHON** When Ethan won the local youth marathon, he ran 10 miles in 104 minutes. How many minutes per mile is this?



**Add or subtract. Write in simplest form.**

1.  $3\frac{3}{5} + 2\frac{1}{10}$       $5\frac{7}{10}$

2.  $7\frac{1}{8} + 5\frac{3}{4}$

3.  $4\frac{2}{3} + 1\frac{1}{3}$       $6$

4.  $3\frac{3}{4} - 2\frac{1}{3}$

5.  $2\frac{11}{16} - \frac{3}{8}$       $2\frac{5}{16}$

6.  $8 - 4\frac{4}{5}$

7.  $12 - 1\frac{2}{7}$       $10\frac{5}{7}$

8.  $2\frac{1}{2} + 9\frac{1}{8}$

9.  $4\frac{3}{4} + 6\frac{1}{6} - 8$       $2\frac{11}{12}$

10.  $3\frac{1}{9} + 2\frac{2}{9} + 4\frac{1}{3}$

11. **RUGS** Rhett bought a rug that is  $5\frac{5}{16}$  feet wide and  $8\frac{7}{16}$  feet long. How much greater is the length than the width?

$3\frac{1}{8}$

12. **MILK** The table shows how much milk Mrs. Zapchenk's child drank during the day. Find the total amount of milk that the child drank.

Time	Milk (oz)
8 A.M.	$10\frac{1}{2}$
12 P.M.	$8\frac{1}{4}$
6 P.M.	$6\frac{1}{12}$

13. **SEWING** Merin hemmed a skirt she had bought that was too long. When she bought the skirt, it was  $20\frac{5}{8}$  inches long. She shortened it  $2\frac{3}{16}$  inches. How long is the skirt now?

$18\frac{7}{16}$

14. **CLASS PERIODS** Ramey Junior High School has 6 hours of class time in a school day. If  $3\frac{7}{12}$  hours are over, how many hours of class time are still left in the day?

**Multiply. Write in simplest form.**

$$1. \frac{4}{5} \times 3\frac{1}{8} \quad 2\frac{1}{2}$$

$$2. \frac{9}{10} \times 3\frac{1}{3}$$

$$3. 1\frac{3}{5} \times \frac{3}{5} \quad \frac{24}{25}$$

$$4. 2\frac{5}{8} \times \frac{2}{3}$$

$$5. \frac{2}{3} \times 3\frac{1}{4} \quad 2\frac{1}{6}$$

$$6. \frac{3}{4} \times 2\frac{2}{3}$$

$$7. 1\frac{1}{4} \times 2\frac{2}{3} \quad 3\frac{1}{3}$$

$$8. 5\frac{1}{3} \times 2\frac{1}{4}$$

$$9. 2\frac{1}{5} \times 1\frac{1}{4} \quad 2\frac{3}{4}$$

$$10. 6\frac{4}{5} \times 1\frac{2}{3}$$

$$11. 3\frac{3}{7} \times 5\frac{1}{8} \quad 17\frac{4}{7}$$

$$12. 8\frac{3}{4} \times 4\frac{1}{5}$$

$$13. \frac{2}{9} \times \frac{3}{4} \times 2\frac{1}{4} \quad \frac{3}{8}$$

$$14. 5\frac{1}{2} \times 3\frac{1}{3} \times \frac{1}{6}$$

$$15. 1\frac{1}{2} \times 2\frac{1}{6} \times 1\frac{1}{5} \quad 3\frac{9}{10}$$

**16. LUMBER** A lumber yard has a scrap sheet of plywood that is  $23\frac{3}{4}$  inches by  $41\frac{1}{5}$  inches. What is the area of the plywood?

**17. LANDSCAPING** A planter box in the city plaza measures  $3\frac{2}{3}$  feet by  $4\frac{1}{8}$  feet by  $2\frac{1}{2}$  feet. Find the volume of the planter box.

$$37\frac{13}{16}$$

Divide. Write in simplest form.

$$1. 2 \div 3\frac{2}{3} \quad \frac{6}{11}$$

$$2. 10 \div 1\frac{1}{4}$$

$$3. 4\frac{3}{4} \div \frac{7}{8} \quad 5\frac{3}{7}$$

$$4. 1\frac{15}{16} \div \frac{7}{8}$$

$$5. 7\frac{1}{2} \div 1\frac{1}{4} \quad 6$$

$$6. 3\frac{3}{8} \div 2\frac{1}{4}$$

$$7. 2\frac{1}{10} \div 1\frac{1}{5} \quad 1\frac{3}{4}$$

$$8. 4\frac{1}{2} \div 2\frac{7}{10}$$

9. **HURRICANES** Suppose a hurricane traveled 130 miles from a point in the Atlantic Ocean to the Florida coastline in  $6\frac{1}{2}$  hours. How many miles per hour did the hurricane travel?

20

10. **PIPES** How many  $\frac{3}{4}$ -foot lengths of pipe can be cut from a  $6\frac{1}{3}$ -foot pipe?

11. **TRUCKING** A truck driver drove 300 miles in  $6\frac{3}{4}$  hours. How many miles per hour did the driver drive?

$44\frac{4}{9}$  miles per hr.

12. **BAKING** A bag contain  $22\frac{1}{2}$  cups of flour. A recipe for pancakes uses  $1\frac{1}{4}$  cups of flour. How many servings of pancakes can be made with one bag of flour?

## Exponents

An *exponent* tells how many times a number is used as a factor.

$3 \times 3 \times 3 \times 3$  shows the number 3 is used as a factor 4 times.

$3 \times 3 \times 3 \times 3$  can be written  $3^4$ .

In  $3^4$ , 3 is the *base* and 4 is the *exponent*.

Read  $3^4$  as "three to the fourth power."

- To *simplify* a power, first write it as a product.

$$2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32$$

- When you simplify expressions with exponents, do all operations inside parentheses first. Then simplify the powers.

$$\begin{aligned} \text{Example: } 30 - (2 + 3)^2 &= 30 - 5^2 \\ &= 30 - 25 \\ &= 5 \end{aligned}$$

## Order of Operations

To find the value of an expression follow the *order of operations*.

**First**, do all operations inside parentheses.

**Next**, multiply and divide from left to right.

**Then**, add and subtract from left to right.

*Example 1* Find the value of  $6 + (3 + 4) \times 2$ .

- ① Work inside parentheses.  $\rightarrow (3 + 4) = 7$

$$6 + 7 \times 2$$

- ② Multiply next.  $\rightarrow 7 \times 2 = 14$

$$6 + 14$$

- ③ Then, add.

$$6 + 14 = 20$$

*Example 2* Compare  $10 - (6 \div 2) + 1$  and  $(10 - 6) \div 2 + 1$ .

First, find the value of each expression.

$$\begin{array}{r} 10 - (6 \div 2) + 1 \\ 10 - 3 + 1 \\ 7 + 1 \\ 8 \end{array} \quad \begin{array}{r} (10 - 6) \div 2 + 1 \\ 4 \div 2 + 1 \\ 2 + 1 \\ 3 \end{array}$$

Then, use  $<$ ,  $=$ , or  $>$  to compare.

$$8 > 3$$

So,

$$10 - (6 \div 2) + 1 > (10 - 6) \div 2 + 1$$

Solve each expression using the correct order of operations.

$$2^3 \times (8 + 4 - 10)$$

16

$$2 \times (3^3 - 5 + 8)$$

$$(3 \times 2^2) \div (6 - 4)$$

6

$$3^3 \times (6 + 2 - 8)$$

$$(3^2 - 8 + 2) \times 4$$

12

$$(9^2 - 8 + 2) \div 5$$

$$(3 + 5^2 - 8) \times 4$$

80

$$(2^3 + 4) \div (9 - 6)$$

$$(6 - 2^2 + 5) \times 8$$

56

$$(2^3 + 8 - 4) \div 3$$

Instructions: Write an algebraic expression for each phrase.

a number decreased by ninety-two

$$\underline{n - 92}$$

the sum of eighty-nine and a number

$$\underline{89 + n}$$

a number added to thirty-six

$$\underline{36 + n}$$

the sum of a number and twenty-six

$$\underline{n + 26}$$

the difference between forty-six and a number

$$\underline{46 - n}$$

the sum of a number and forty-three

$$\underline{n + 43}$$

the quotient of twenty and a number

$$\underline{\frac{20}{n}}$$

a number increased by sixty-five

$$\underline{n + 65}$$

the sum of seventy and a number

$$\underline{70 + n}$$

a number increased by eighteen

$$\underline{n + 18}$$

fifty-five times a number

$$\underline{55n}$$

fourteen times a number

$$\underline{14n}$$

a number increased by sixty-five

$$\underline{n + 65}$$

the sum of fifty-two and a number

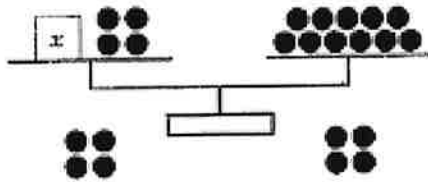
$$\underline{52 + n}$$

seventy-five more than a number

$$\underline{n + 75}$$

## Addition Equations

There are 4 more than needed to fill the  $x$  box.



$$x + 4 = 11$$

To solve this equation, find the value of  $x$  that makes the scales balance.

Since 4 is added to  $x$ , subtract 4 from both sides.

$$\begin{aligned} x + 4 &= 11 \\ x + 4 - 4 &= 11 - 4 \\ x &= 7 \end{aligned}$$

The solution to the equation is  $x = 7$ .

## Subtraction Equations

$$r - 3 = 9$$

To solve this equation, find the value of  $r$ .

Since 3 is subtracted from  $r$ , add 3 to both sides.

$$\begin{aligned} r - 3 &= 9 \\ r - 3 + 3 &= 9 + 3 \\ r &= 12 \end{aligned}$$

The solution to the equation is  $r = 12$ .

Solve each equation.

1.  $a + 15 = 31$

$$a + 15 - \underline{\quad} = 31 - \underline{\quad}$$

$$a = \underline{16}$$

2.  $5 = x - 20$

$$5 + \underline{\quad} = x - 20 + \underline{\quad}$$

$$\underline{\quad} = x$$

3.  $19 + t = 51$

$$\underline{\quad} = \underline{t = 32}$$

4.  $p - 11 = 12$

5.  $60 = n + 30$

$$\underline{\quad} = \underline{n = 30}$$

6.  $71 = b - 29$

7.  $86 + m = 107$

8.  $w + 349 = 761$

$$\underline{\quad} = \underline{m = 21}$$

9.  $50 - y = 30$

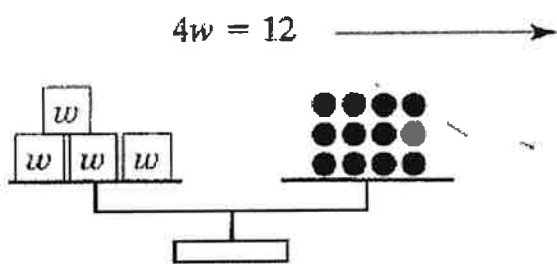
10.  $d - 125 = 75$

$$\underline{\quad} = \underline{y = 20}$$

11. A car dealer purchased a car for \$2,000 and then sold it for \$3,200. Write and solve an equation to find the profit.

$$\begin{aligned} \underline{2000} + p &= 3200 \\ p &= 1200 \end{aligned}$$

What value of  $w$  makes the scales balance?



$$4w = 12$$

To solve the multiplication sentence, use division.

$$4w = 12$$

$$4w \div 4 = 12 \div 4 \leftarrow \text{Divide both sides by 4.}$$

$$w = 3$$

The solution is  $w = 3$ .

To solve a division sentence, use multiplication.

$$y \div 3 = 7$$

$$y \div 3 \times 3 = 7 \times 3 \leftarrow \text{Multiply both sides by 3.}$$

$$y = 21$$

The solution is  $y = 21$ .

State whether the number given is a solution to the equation.

1.  $3g = 36; g = 12$

yes

2.  $t \div 8 = 2; t = 4$

\_\_\_\_\_

3.  $h \div 7 = 21; h = 3$

No

4.  $18 = 3m; m = 6$

\_\_\_\_\_

5.  $6a = 18; a = 3$

yes

6.  $36 = r \div 9; r = 4$

\_\_\_\_\_

Solve each equation.

7.  $12 = 4y$

$$12 \div \underline{\quad} = 4y \div \underline{\quad}$$

$$\underline{3} = y$$

8.  $n \div 9 = 4$

$$n \div 9 \times \underline{\quad} = 4 \times \underline{\quad}$$

$$n = \underline{\quad}$$

9.  $23n = 115$

$$\underline{n = 5}$$

10.  $z \div 9 = 9$

\_\_\_\_\_

11.  $48 = 12h$

$$\underline{h = 4}$$

12.  $10w = 150$

\_\_\_\_\_

13.  $34 = t \div 14$

$$\underline{t = 476}$$

14.  $105 = 21t$

\_\_\_\_\_

15.  $64 = e \div 9$

$$\underline{e = 576}$$

16.  $8v = 32$

\_\_\_\_\_

17.  $22 = t \div 4$

$$\underline{t = 88}$$

18.  $3s = 66$

\_\_\_\_\_

19.  $21 = b \div 2$

$$\underline{b = 42}$$

20.  $15n = 45$

\_\_\_\_\_