

CHAPTER

1

Number Connections

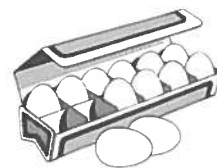
- 1.1 Exponents**
- 1.2 Integral Exponents**
- 1.3 Problem Solving: Look for a Pattern**
- 1.4 Scientific Notation: Large Numbers**
- 1.5 Scientific Notation: Small Numbers**
- 1.6 Rational Numbers**
- 1.7 Problem Solving: Use a Data Bank**
- 1.8 Ratios**
- 1.9 Percents**
- 1.10 Ratios, Fractions, Decimals, and Percents**
- 1.11 Squares and Square Roots**
- 1.12 Problem Solving: Sequence the Operations**

Review

Chapter Check

Problem Solving: Using the Strategies

Answers CHAPTER 1 Number Connections



Skill Builder

Find the bingo.

First: Calculate.

130	180	160	260	30
70	90	140	80	150
40	100	FREE	200	190
60	20	220	10	120
50	300	150	110	170

$$\begin{array}{r} 5 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 25 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 35 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 45 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 55 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 65 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 75 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 25 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 35 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 45 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 55 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 65 \\ \times 4 \\ \hline \end{array}$$

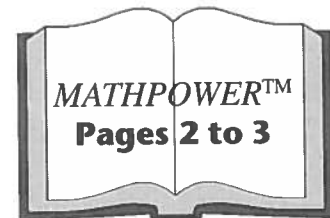
$$\begin{array}{r} 75 \\ \times 4 \\ \hline \end{array}$$

Second: Find the answer on the bingo card and colour it.

GETTING STARTED



Work together with your class, using your *MATHPOWER*TM student text, pages 2 to 3.



Mental Math

1. Add.

$$\begin{array}{r} \text{a) } 54 \\ + 32 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b) } 77 \\ + 81 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c) } 19 \\ + 99 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d) } 44 \\ + 88 \\ \hline \end{array}$$

$$\begin{array}{r} \text{e) } 127 \\ + 73 \\ \hline \end{array}$$

$$\begin{array}{r} \text{f) } 638 \\ + 73 \\ \hline \end{array}$$

$$\begin{array}{r} \text{g) } 15 \\ 65 \\ + 45 \\ \hline \end{array}$$

$$\begin{array}{r} \text{h) } 109 \\ 56 \\ + 22 \\ \hline \end{array}$$

$$\begin{array}{r} \text{i) } 34 \\ 56 \\ + 73 \\ \hline \end{array}$$

$$\begin{array}{r} \text{j) } 182 \\ 40 \\ + 34 \\ \hline \end{array}$$

$$\begin{array}{r} \text{k) } 71 \\ 13 \\ + 42 \\ \hline \end{array}$$

$$\begin{array}{r} \text{l) } 88 \\ 13 \\ + 54 \\ \hline \end{array}$$



NO CALCULATOR

2. Subtract.

$$\begin{array}{r} \text{a) } 369 \\ - 42 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b) } 48 \\ - 26 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c) } 173 \\ - 64 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d) } 81 \\ - 37 \\ \hline \end{array}$$

$$\begin{array}{r} \text{e) } 600 \\ - 58 \\ \hline \end{array}$$

$$\begin{array}{r} \text{f) } 129 \\ - 38 \\ \hline \end{array}$$

$$\begin{array}{r} \text{g) } 528 \\ - 65 \\ \hline \end{array}$$

$$\begin{array}{r} \text{h) } 733 \\ - 46 \\ \hline \end{array}$$

$$\begin{array}{r} \text{i) } 366 \\ - 27 \\ \hline \end{array}$$

$$\begin{array}{r} \text{j) } 208 \\ - 19 \\ \hline \end{array}$$

$$\begin{array}{r} \text{k) } 188 \\ - 96 \\ \hline \end{array}$$

$$\begin{array}{r} \text{l) } 500 \\ - 68 \\ \hline \end{array}$$

3. Multiply.

$$\begin{array}{r} \text{a) } 12 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b) } 80 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c) } 90 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d) } 90 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} \text{e) } 12 \\ \times 60 \\ \hline \end{array}$$

$$\begin{array}{r} \text{f) } 15 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} \text{g) } 55 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} \text{h) } 49 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} \text{i) } 99 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} \text{j) } 19 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} \text{k) } 105 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} \text{l) } 23 \\ \times 9 \\ \hline \end{array}$$

4. Divide.

$$\text{a) } 9 \overline{)720}$$

$$\text{b) } 9 \overline{)8100}$$

$$\text{c) } 6 \overline{)240}$$

$$\text{d) } 6 \overline{)360}$$

$$\text{e) } 80 \overline{)720}$$

$$\text{f) } 10 \overline{)150}$$

$$\text{g) } 15 \overline{)150}$$

$$\text{h) } 70 \overline{)5600}$$

$$\text{i) } 30 \overline{)1500}$$

$$\text{j) } 8 \overline{)960}$$

Skill Builder

1. A letter is hidden in the square. Colour the spaces with the correct answers.

$3^2 = \square \quad 9^2 = \square \quad 10^2 = \square \quad 5^2 = \square$

$6^2 = \square \quad 1^2 = \square \quad 7^2 = \square \quad 4^2 = \square$

5	1	10	46	6
8	16	66	54	14
2	100	24	48	32
20	36	91	18	72
12	49	25	81	9

2. State the **value** of the underlined digit in each number.

a) $120\underline{2}1 \rightarrow \underline{20}$ or _____

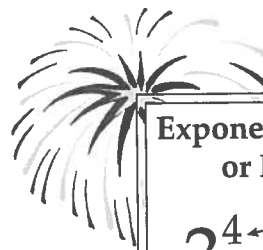
b) $4\underline{8}36 \rightarrow$ _____ or **8 hundred** c) $65.00\underline{3} \rightarrow \underline{0.003}$ or _____

d) $\underline{1}.65 \rightarrow \underline{1}$ or _____ e) $0.\underline{4}5 \rightarrow$ _____ or **4 tenths**

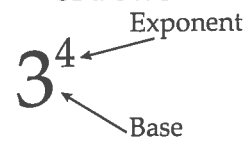
f) $2.87\underline{5} \rightarrow$ _____ or _____ g) $\underline{2}435 \rightarrow$ _____ or _____

1.1 Exponents

Practice



Exponential Form or Power



1. Complete the table.

Power	Base	Exponent	Expanded Form	Standard Form
a) 4^3			$4 \times 4 \times 4$	64
b) 2^5				
c) 5^2				
d) 6^1				
e) 7^2				
f)	2	4		
g)	3	3		
h)			$2 \times 2 \times 2$	
i)	6	2		
j)			9×9	

2. Write in exponential form.

a) $3 \times 3 \times 3 \times 3 = 3^{\square}$

b) $10 \times 10 \times 10 \times 10 = \underline{\hspace{2cm}}$

c) $(2 \times 2 \times 2 \times 2 \times 2 \times 2) \times (2 \times 2)$
 $= \underline{\hspace{2cm}}$

d) $6 \times 6 \times 6 \times 6 \times 6 \times 6 \times 6$
 $= \underline{\hspace{2cm}}$

e) $(5 \times 5) \times (5 \times 5 \times 5) = \underline{\hspace{2cm}}$

f) $(9 \times 9 \times 9) \times (9 \times 9) = \underline{\hspace{2cm}}$

3. State the missing exponent.



a) $2^{\square} = 32$

b) $2^{\square} = 2$

c) $2^{\square} = 8$

d) $3^{\square} = 3$

e) $5^{\square} = 25$

f) $2^{\square} = 16$

g) $3^{\square} = 27$

h) $2^{\square} = 4$

i) $3^{\square} = 9$

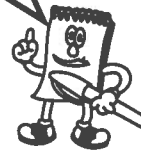
Problems and Applications

4. Simplify. Leave each answer in exponential form.

Example: $4^2 \times 4^3 = 4^{2+3}$
 $= 4^5$

To multiply powers with the same base, add the exponents.

Show your work.



a) $2^6 \times 2^2 = 2^{6+2}$
 $= 2^{\square}$

b) $3^3 \times 3^2 = \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

c) $5^4 \times 5^5 = \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

d) $6^1 \times 6^4 = \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

e) $1^5 \times 1^4 \times 1^2 = \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

f) $10^3 \times 10^4 \times 10^2 = \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

5. Simplify. Leave each answer in exponential form.

Example: $3^5 \div 3^2 = 3^{5-2}$
 $= 3^3$

To divide powers with the same base, subtract the exponents.

a) $5^5 \div 5^4 = 5^{5-4}$
 $= 5^{\square}$

b) $2^8 \div 2^6 = \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

c) $3^6 \div 3^3 = \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

d) $1^7 \div 1^3 = \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

e) $6^8 \div 6^6 = \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

f) $7^5 \div 7 = \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

6. Simplify. Leave each answer in exponential form.

Example: $(3^2)^4 = 3^{2 \times 4}$
 $= 3^8$

To raise a power to a power, multiply the exponents.

a) $(2^2)^2 = 2^{2 \times 2}$
 $= 2^{\square}$

b) $(10^2)^3 = \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

c) $(2^4)^2 = \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

d) $(1^5)^6 = \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

7. Evaluate.



Press \boxed{C} $\boxed{2}$ $\boxed{y^x}$ $\boxed{4}$ $\boxed{=}$ $\boxed{\text{Answer}}$

a) $2^4 = \underline{\hspace{2cm}}$

b) $3^4 = \underline{\hspace{2cm}}$

c) $10^5 = \underline{\hspace{2cm}}$

d) $2^8 = \underline{\hspace{2cm}}$

e) $1^{11} = \underline{\hspace{2cm}}$

f) $3^5 = \underline{\hspace{2cm}}$

g) $6^7 = \underline{\hspace{2cm}}$

h) $4^4 = \underline{\hspace{2cm}}$

8. a) Complete the following to show *two ways* to solve $4^2 \div 4^2$.

$$4^2 \div 4^2 = 4^{\boxed{}} - \boxed{}$$

$$= 4^{\boxed{}}$$

OR

$$4^2 \div 4^2 = \frac{4 \times 4}{4 \times 4}$$

$$= \frac{\boxed{}}{16}$$

$$= \underline{\hspace{2cm}}$$

b) Evaluate: $4^0 = \underline{\hspace{2cm}}$

9. Complete the patterns.



a) $2^0, 2^1, 2^2, 2^3, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}.$
 $\downarrow \downarrow \downarrow \downarrow \downarrow \downarrow$
 1, 2, 4, 8, $\underline{\hspace{1cm}}, \underline{\hspace{1cm}}.$

b) $3^0, 3^1, 3^2, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}.$
 $\downarrow \downarrow \downarrow \downarrow \downarrow$
 1, 3, 9, $\underline{\hspace{1cm}}, \underline{\hspace{1cm}}.$

c) $4^0, 4^1, 4^2, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}.$
 $\downarrow \downarrow \downarrow \downarrow \downarrow \downarrow$
 1, 4, 16, $\underline{\hspace{1cm}}, \underline{\hspace{1cm}}.$

d) $10^0, 10^1, 10^2, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}.$
 $\downarrow \downarrow \downarrow \downarrow \downarrow$
 1, 10, 100, $\underline{\hspace{1cm}}, \underline{\hspace{1cm}}.$

10. John noticed he had one tadpole in his aquarium. Every ten minutes, the number of tadpoles **doubled**. How many tadpoles were there after one hour?

Hint:

Time	10 min	20 min	30 min	40 min	50 min	60 min
Number of Tadpoles						

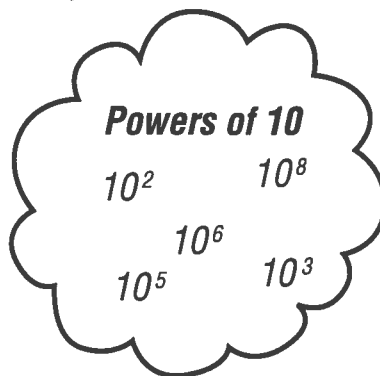


Sentence: _____

Skill Builder

1. Match each power of ten with the standard form.

- _____ a) 1000
- _____ b) 100 000
- _____ c) 100
- _____ d) 1 000 000
- _____ e) 100 000 000



2. Complete each pattern.

- a) 2, 4, 6, 8, 10, ____.
- b) 1, 3, 5, 7, 9, ____.
- c) 1, 2, 4, 7, 11, ____.
- d) 7, 6, 5, 4, ____.
- e) 4, 3, 2, 1, 0, ____.
- f) 2, 1, 0, -1, -2, ____.
- g) $3^0, 3^1, 3^2, \dots$
- h) $4^3, 4^2, 4^1, \dots$
- i) $6^3, 6^2, 6^1, 6^0, \dots$
- j) $2^2, 2^1, 2^0, 2^{-1}, \dots$
- k) $5^2, 5^1, 5^0, \dots$
- l) $7^0, 7^{-1}, 7^{-2}, \dots$

1.2 Integral Exponents

Practice

1. Complete the table.

Standard Form	Repeated Multiplication	Exponent Form
a) 1000	$10 \times 10 \times \square$	10^{\square}
b) 100 000		
c) 100		
d) 10 000 000		
e) $\frac{1}{1000}$	$\frac{1}{10 \times 10 \times \square}$	10^{-3}
f) $\frac{1}{1\,000\,000}$		
g) $\frac{1}{10\,000\,000}$		
h) $\frac{1}{100}$		

2. Complete the table to find the exponent form of each.

Remember: $0.1 = \frac{1}{10}$

Standard Form	Write as a fraction.	Exponent Form
a) 0.0001	$\frac{1}{10\ 000}$	10^{\square}
b) 0.01		
c) 0.000 01		
d) 0.000 000 1		
e) 0.1		
f) 0.001		

3. Express in standard form.

Example: a) $10^5 = \underline{100\ 000}$ b) $10^{-5} = \underline{0.000\ 01}$

- a) $10^4 = \underline{\hspace{2cm}}$ b) $10^6 = \underline{\hspace{2cm}}$ c) $10^2 = \underline{\hspace{2cm}}$
 d) $10^{-4} = \underline{\hspace{2cm}}$ e) $10^{-2} = \underline{\hspace{2cm}}$ f) $10^{-9} = \underline{\hspace{2cm}}$
 g) $10^{-1} = \underline{\hspace{2cm}}$ h) $10^1 = \underline{\hspace{2cm}}$ i) $10^0 = \underline{\hspace{2cm}}$

Problems and Applications

4. The circumference of Earth is about 10 000 km. Write this number in exponential form.

Sentence: _____

5. The circumference of Earth is about $\frac{1}{100}$ of the circumference of the sun. Write this fraction in **decimal form** and in **exponential form**.

Sentence: _____

6. For each of the following, circle the **greater** number.

Change each power to standard form.

a) $10^2, 1000$
 $10^2 = \underline{\hspace{2cm}}$

b) $10^{-2}, 0.0001$

c) $\frac{1}{10}, 10^0$

d) $10^2, \frac{1}{100}$

e) $10^{-3}, 0.01$

f) $0.0001, 10^{-5}$

Skill Builder

1. Complete each pattern by counting forward by 3.

a) $3, 6, \quad, 12, 15, \quad, \quad$

b) $2, 5, 8, \quad, \quad, \quad, 20$

c) $10, 13, \quad, \quad, 22, \quad, \quad$

2. Complete each pattern by counting backward by 2.

a) $18, 16, 14, \quad, \quad, \quad, 6$

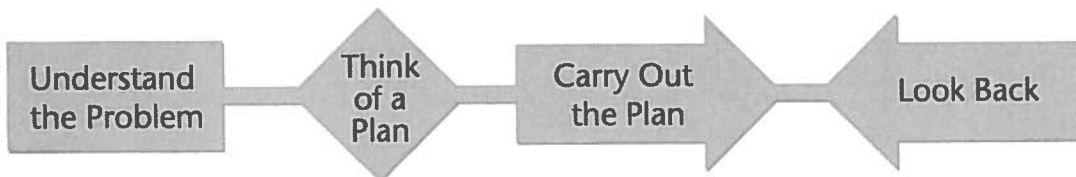
b) $21, 19, \quad, 15, 11, 7$

c) $35, \quad, \quad, 29, \quad, \quad, \quad$

d) $10, 8, \quad, 4, \quad, \quad, \quad$

Rough Work:

1.3 Problem Solving: Look for a Pattern



Problems and Applications

1. Write the next 3 numbers to continue each pattern. Describe the pattern.

a) 2, 4, 6, 8, _____, _____, _____.

Pattern → Add .

b) 3, 7, 11, 15, _____, _____, _____.

Pattern → _____.

c) 62, 61, 60, 59, _____, _____, _____.

Pattern → _____.

d) 49, 46, 43, 40, _____, _____, _____.

Pattern → _____.

e) 2, 4, 8, 16, _____, _____, _____.

Pattern → _____.

f) 3, 6, 12, 24, _____, _____, _____.

Pattern → _____.

g) a, c, e, g, _____, _____, _____.

Pattern → _____.

h) z, y, x, w, _____, _____, _____.

Pattern → _____.

2. Describe the pattern, then complete each table.

a)

3	7
4	8
8	12
5	
	4

Pattern → Add .

b)

2	6
5	15
7	21
8	
	30

Multiply by .

c)

7	5
10	8
9	7
11	
	4

_____.

d)

12	21	9	24	
4	7	3		5

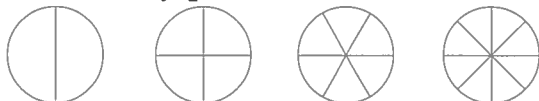
Pattern → _____.

e)

6	10	20	11	
11	15		16	7

_____.

3. a) How many pieces are in each circle?





b) How many pieces would be in the 6th circle? _____

c) Describe the pattern.

4. The first diagram shows 1 angle, $\angle ABC$.

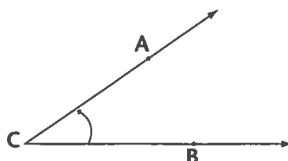


Diagram 1

The second diagram shows 3 angles, $\angle ABC$, $\angle ABD$, and \angle _____.

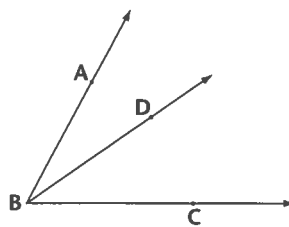


Diagram 2

The third diagram shows 6 angles.

They are

\angle _____, \angle _____, \angle _____,

\angle _____, \angle _____, \angle _____.

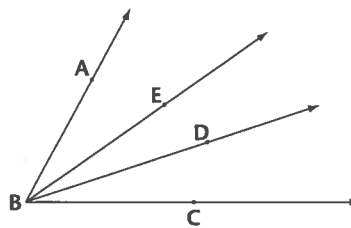


Diagram 3

Continue the pattern to find how many angles are in the Diagram 4.

Draw 4 more rays from point A.



Diagram 4

Pattern is 1, 3, 6, _____, _____.



5. The table below gives the sum of even numbers.

a) Complete the table.



$$2 + 4 = 6$$

$$2 + 4 + 6 = \underline{\hspace{2cm}}$$

$$2 + 4 + 6 + 8 = \underline{\hspace{2cm}}$$

$$2 + 4 + 6 + 8 + 10 = \underline{\hspace{2cm}}$$

$$2 + 4 + 6 + 8 + 10 + 12 = \underline{\hspace{2cm}}$$

b) Describe the pattern. _____

Skill Builder

1. Write each number in standard form.

a) $10^3 = \underline{\hspace{2cm}}$

$10^3 = 10 \times 10 \times 10$

b) $10^5 = \underline{\hspace{2cm}}$

$10^5 =$

c) $10^2 = \underline{\hspace{2cm}}$

$10^2 =$

d) $10^6 = \underline{\hspace{2cm}}$

e) $10^1 = \underline{\hspace{2cm}}$

f) $10^4 = \underline{\hspace{2cm}}$

2. Evaluate.

Example: $10^{-4} = \frac{1}{10 \times 10 \times 10 \times 10}$
 $= 0.0001$

a) $10^{-3} = \underline{\hspace{2cm}}$

$10^{-3} = \frac{1}{10 \times 10 \times 10}$

b) $10^{-2} = \underline{\hspace{2cm}}$

c) $10^{-1} = \underline{\hspace{2cm}}$

d) $10^{-6} = \underline{\hspace{2cm}}$

e) $10^{-7} = \underline{\hspace{2cm}}$

f) $10^{-5} = \underline{\hspace{2cm}}$



Use a calculator to calculate each of the following:

1. $10^{-4} = \underline{\hspace{2cm}}$

Press \boxed{C} $\boxed{10}$ $\boxed{y^x}$ $\boxed{4}$ $\boxed{\div}$ $\boxed{=}$

2. $10^{-6} = \underline{\hspace{2cm}}$

3. $4^{-5} = \underline{\hspace{2cm}}$

4. $1^{-7} = \underline{\hspace{2cm}}$

5. $3^{-2} = \underline{\hspace{2cm}}$

1.4 Scientific Notation: Large Numbers

Practice

1. "What do you call a dog that chases an entire soccer team?"

Match the letter of each number in Column B that will give the value of the missing exponent in Column A. Find the answer to the above question.

Column A

___ a) $9700 = 9.7 \times 10^{\square}$

___ b) $260\,000 = 2.6 \times 10^{\square}$

___ c) $3\,680\,000 = 3.68 \times 10^{\square}$

___ d) $85\,000 = 8.5 \times 10^{\square}$

___ e) $700 = 7 \times 10^{\square}$

___ f) $55\,000\,000 = 5.5 \times 10^{\square}$

Column B

U. 5

G. 4

H. 3

R. 2

Y. 7

N. 6



_____ a) b) c) d) e) f)

2. Write the missing value in the .

a) $78\,000 = \boxed{7.8} \times 10^4$

b) $490 = \boxed{} \times 10^2$

c) $96\,400 = \boxed{} \times 10^4$

d) $4\,000\,000 = \boxed{} \times 10^6$

e) $650\,000\,000 = \boxed{} \times 10^8$

f) $3940 = \boxed{} \times 10^3$

3. Complete the chart.

Standard Form	Scientific Notation
a) 125 000	$1.25 \times 10^{\square}$
b) 823 000 000	
c) 58 000	
d) 2 500 000	
e) 6000	

Standard Form	Scientific Notation
f) 760	
g) 8940	
h) 365 000	
i) 60 000	
j) 280 000	

Problems and Applications

4. Write each number in standard form.

a) $3.9 \times 10^4 =$ 39 000

b) $7.35 \times 10^2 =$ _____

c) $5.2 \times 10^3 =$ _____

d) $8 \times 10^6 =$ _____

e) $7.5 \times 10 =$ _____

f) $2.8 \times 10^8 =$ _____

g) $3 \times 10^2 =$ _____

h) $3.91 \times 10^4 =$ _____

5. Write each number in scientific notation.

a) Lightning can travel 8 400 000 km/h. _____

b) The area of Greenland is about 2 170 000 km². _____

c) The Columbia River is about 2000 km long. _____

6. Use your calculator to find **one** mistake below. (Correct it with a red pen.)



a) $3.9 \times 10^4 = 39\,000$

Press 3.9 10 4

b) $6.29 \times 10^3 = 6290$

c) $4 \times 10^3 = 4000$

d) $3.45 \times 10 = 345$

Skill Builder

Write each number in scientific notation.

a) $35\,700 = 3.57 \times 10^{\square}$

b) $4\,000\,000 =$ _____

c) $61\,000\,000 =$ _____

d) $830\,000 =$ _____

Mental Math



Time yourself!

1. Multiply.

a) $6 \times 4 =$ _____

b) $6 \times 40 =$ _____

c) $3 \times 5 =$ _____

d) $3 \times 50 =$ _____

e) $7 \times 7 =$ _____

2. Divide.

a) $45 \div 9 =$ _____

b) $450 \div 9 =$ _____

c) $8 \div 4 =$ _____

d) $80 \div 4 =$ _____

e) $35 \div 5 =$ _____



NO CALCULATOR

Number Correct: _____ ✓

Time: _____ s

1.5 Scientific Notation: Small Numbers

Practice

1. Write the value of each exponent.

Example: $0.036 = 3.6 \times 10^{\boxed{-2}}$

a) $0.027 = 2.7 \times 10^{\boxed{}}$

b) $0.000\ 08 = 8 \times 10^{\boxed{}}$

c) $0.54 = 5.4 \times 10^{\boxed{}}$

d) $0.0037 = 3.7 \times 10^{\boxed{}}$

e) $0.00\ 625 = 6.25 \times 10^{\boxed{}}$

f) $0.000\ 009 = 9 \times 10^{\boxed{}}$

2. Find the value for each $\boxed{}$.

Example: $0.00087 = \boxed{8.7} \times 10^{-4}$

a) $0.0046 = \boxed{} \times 10^{-3}$

b) $0.000\ 053 = \boxed{} \times 10^{-5}$

c) $0.024 = \boxed{} \times 10^{-2}$

d) $0.99 = \boxed{} \times 10^{-1}$

e) $0.0004 = \boxed{} \times 10^{-4}$

f) $0.000\ 000\ 73 = \boxed{} \times 10^{-7}$

3. Write each number in scientific notation.

a) $0.000\ 46 = 4.6 \times 10^{\boxed{}}$

b) $0.000\ 003 = \underline{\hspace{2cm}}$

c) $0.0124 = \underline{\hspace{2cm}}$

d) $0.000\ 078 = \underline{\hspace{2cm}}$

e) $0.0001 = \underline{\hspace{2cm}}$

f) $0.000\ 000\ 27 = \underline{\hspace{2cm}}$

4. Write each number in standard form.

Example: $2.8 \times 10^{-4} = 0.000\ 28$

a) $5.8 \times 10^{-4} = \underline{\hspace{2cm}}$

b) $2.03 \times 10^{-2} = \underline{\hspace{2cm}}$

c) $7.96 \times 10^{-6} = \underline{\hspace{2cm}}$

d) $4.5 \times 10^{-7} = \underline{\hspace{2cm}}$

e) $1.03 \times 10^{-5} = \underline{\hspace{2cm}}$

f) $3.45 \times 10^{-3} = \underline{\hspace{2cm}}$

Problems and Applications

5. Express each number in the sentences below in scientific notation.

- a) The diameter of some cells is 0.005 mm. $0.005 = 5 \times 10^{\square}$
- b) Fresh water covers 0.019 of the area of British Columbia. _____
- c) Victoria gets 0.37 times as much snow fall as Edmonton. _____

Skill Builder



NO CALCULATOR

1. Divide.

- a) $6 \div (-3) =$ _____ b) $(-16) \div 2 =$ _____
- c) $(-18) \div 6 =$ _____ d) $(-24) \div 6 =$ _____
- e) $(-24) \div (-8) =$ _____ f) $(-30) \div (-5) =$ _____

HINT:

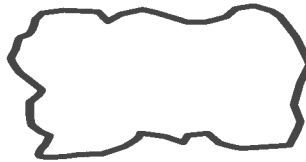
$$\begin{array}{l} \oplus \div \oplus = \oplus \\ \oplus \div \ominus = \ominus \\ \ominus \div \ominus = \oplus \\ \ominus \div \oplus = \ominus \end{array}$$

2. Express each ratio in simplest form.

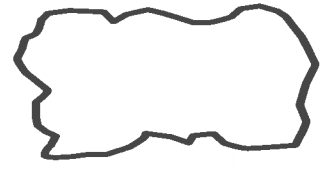
a) $4:8 = \square : 2$

$$\frac{4 \div 4}{8 \div 4} = \frac{\square}{2}$$

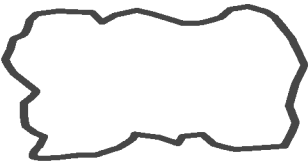
b) $5:15 =$ _____



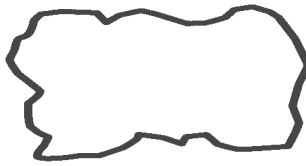
c) $35:7 =$ _____



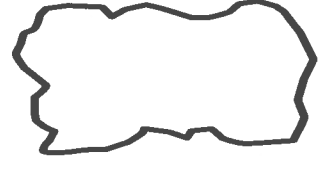
d) $16:4 =$ _____



e) $14:4 =$ _____



f) $8:6 =$ _____



Mental Math



Time yourself!



NO CALCULATOR

1. Multiply.

a) $4 \times 4 =$ _____

b) $4 \times 40 =$ _____

c) $9 \times 10 =$ _____

d) $9 \times 100 =$ _____

2. Divide.

a) $64 \div 8 =$ _____

b) $640 \div 8 =$ _____

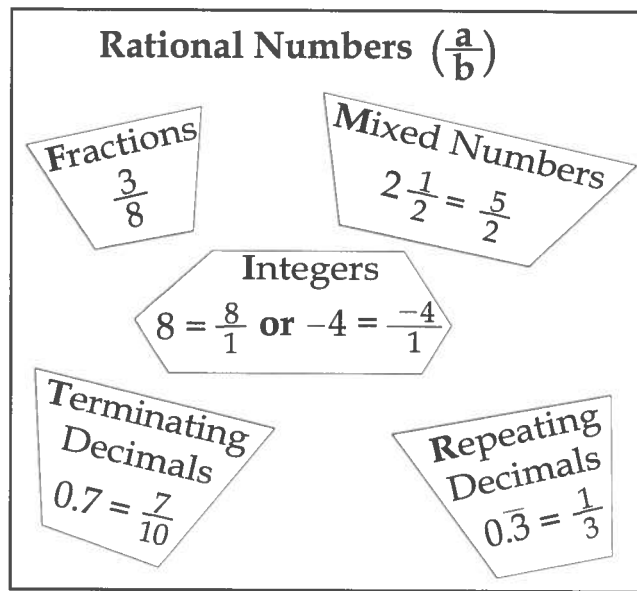
c) $10 \div 10 =$ _____

d) $100 \div 10 =$ _____

Number
Correct: _____

Time: _____ s

1.6 Rational Numbers



Practice

1. Circle the rational numbers.

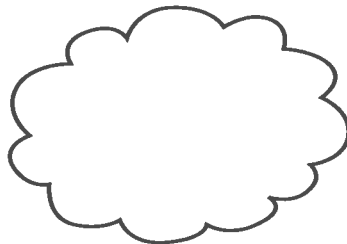
$\frac{1}{2}$ $\frac{2}{5}$ $-\frac{1}{3}$ $\frac{-3}{0}$ $\frac{0}{-4}$ 0 -7 $\sqrt{2}$

2. Express each rational number in an equivalent form.

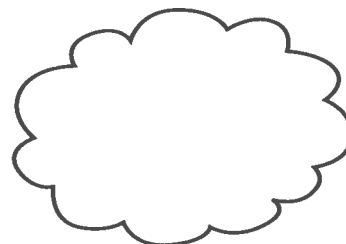
a) $\frac{-2}{5} = \frac{\square}{\square}$

$\frac{-2 \times 2}{5 \times 2} = \frac{\square}{\square}$

b) $\frac{3}{-4} = \frac{\square}{\square}$



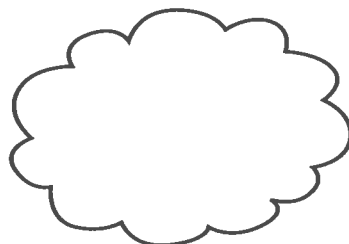
c) $\frac{-6}{-12} = \frac{\square}{\square}$



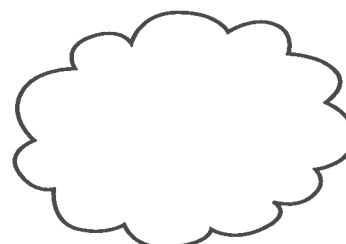
d) $7 = \frac{\square}{\square}$

$7 = \frac{7}{\square}$

e) $-5 = \frac{\square}{\square}$



f) $12 = \frac{\square}{\square}$

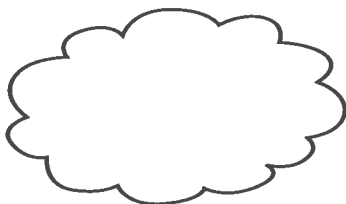


3. Write each rational number in lowest terms.

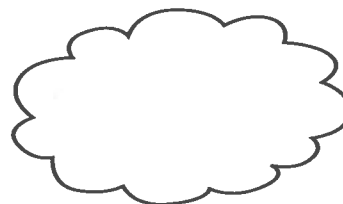
a) $\frac{4}{8} = \frac{\square}{\square}$

$\frac{4 \div 4}{8 \div 4} = \frac{\square}{\square}$

b) $\frac{12}{15} = \frac{\square}{\square}$



c) $\frac{-3}{6} = \frac{\square}{\square}$



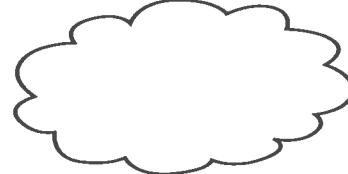
d) $\frac{2}{-8} = \frac{\square}{\square}$



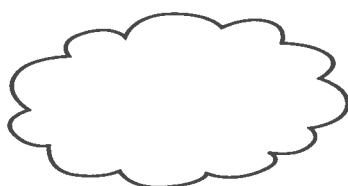
e) $\frac{-14}{2} = \frac{\square}{\square}$



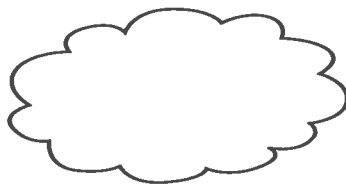
f) $\frac{-8}{10} = \frac{\square}{\square}$



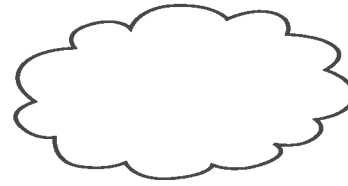
g) $\frac{-18}{21} = \frac{\square}{\square}$



h) $\frac{-3}{9} = \frac{\square}{\square}$



i) $\frac{10}{15} = \frac{\square}{\square}$



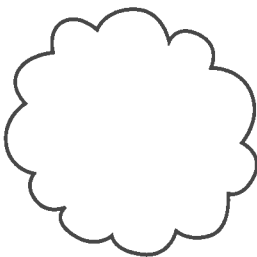
4. Write each of the following as a fraction in lowest terms.

Change to a fraction. Then, reduce.

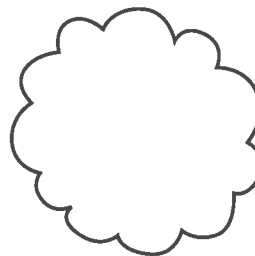
a) 0.4

$0.4 = \frac{4 \div 2}{10 \div \square}$
 $= \frac{\square}{\square}$

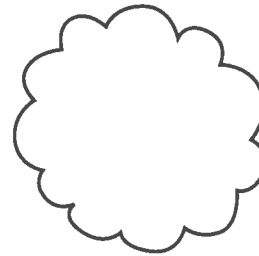
b) -0.3



c) 1.2

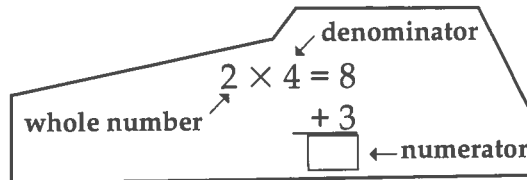


d) -0.25



5. Write each of the following as a fraction.

a) $2 \frac{3}{4} = \frac{\square}{4}$ ← numerator



b) $4 \frac{1}{3} =$

c) $-3 \frac{1}{2} =$

d) $-1 \frac{2}{9} =$

e) $2 \frac{1}{8} =$

f) $-3 \frac{2}{5} =$

6. Which is larger? (Circle the larger number.)



a) $\frac{-1}{2}$ or $\frac{3}{4}$

b) $\frac{3}{5}$ or $\frac{2}{3}$

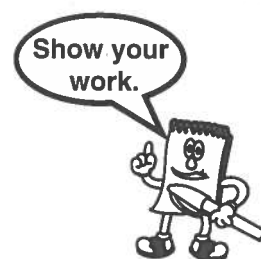
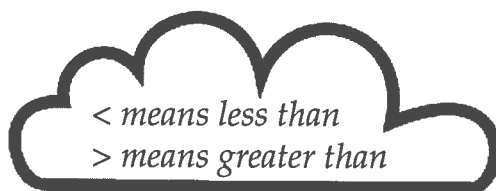
c) $\frac{-3}{5}$ or $\frac{-2}{5}$

d) 0 or $\frac{-4}{5}$

e) 0 or $\frac{-2}{-3}$

f) $-2\frac{1}{3}$ or $3\frac{1}{2}$

7. Write $<$, $>$ or $=$ in each \bigcirc to make the statement true.



a) $\frac{1}{2} \bigcirc \frac{3}{4}$

b) $\frac{11}{12} \bigcirc \frac{5}{6}$

c) $\frac{3}{4} \bigcirc \frac{6}{8}$

LCD = 4

$$\frac{1 \times 2}{2 \times 2} = \frac{\square}{4}$$

$$\frac{2}{4} \bigcirc \frac{3}{4}$$

LCD = \square

LCD = \square

d) $\frac{-2}{2} \bigcirc \frac{-3}{4}$

e) $\frac{3}{-4} \bigcirc \frac{-1}{8}$

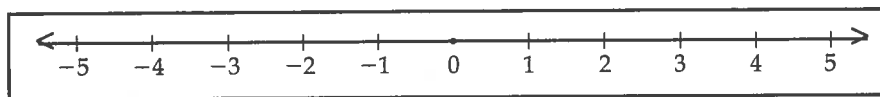
LCD = 12

$$\frac{-2 \times \square}{3 \times \square} = \frac{-\square}{12}; \frac{-3 \times \square}{4 \times \square} = \frac{-\square}{12}$$

$$\frac{-\square}{12} \bigcirc \frac{-\square}{12}$$

LCD = \square

8. Arrange the rational numbers in order from *smallest to largest*.



a) $\frac{1}{3}, 3\frac{1}{2}, -0.5, 2$

b) $1\frac{7}{8}, 2\frac{1}{2}, 1, -\frac{1}{2}, \frac{3}{4}, 2, -1, -1.5$

c) $1\frac{3}{4}, -2, -0.75, 4\frac{1}{2}, -2.6, -3, -3\frac{1}{2}$

Problems and Applications

9. Write each of the following as a rational number.

a) The numerator is 1 and the denominator is greater than 5.

b) The numerator is less than 3 and the denominator is greater than 10.

c) The denominator is -16 and the numerator is an odd number.

10. a) Complete the chart.

Name of City	Number of Consonants	Number of Vowels	<u>Consonants</u> <u>Vowels</u>
i) Montreal	5	3	$\frac{5}{3}$
ii) Red Deer			
iii) Nanaimo			
iv) Saskatoon			
v) Barrie			
vi) Fredericton			

Vowels are
a, e, i,
o, u.

b) List the rational numbers in the last column from *largest to smallest*.

11. State whether each is true or false.

_____ a) An integer is a rational number.

_____ b) $\frac{-2}{5} = \frac{2}{-5}$.

_____ c) $\frac{0}{4} = \frac{4}{0}$.

_____ d) A repeating decimal is not a rational number.

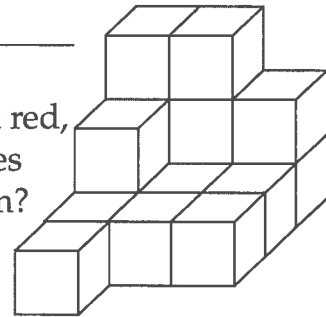
Logic



There are no cubes missing from the back of this stack.
Try building this stack with cubes.

1. How many cubes are in the stack? _____

2. If you painted the outside of the stack red, including the bottom, how many cubes would **not** have any red paint on them?



Mental Math



Time yourself!



NO CALCULATOR

1. Multiply.

a) $7 \times 6 =$ _____

i) $5 \times 8 =$ _____

f) $12 \div 4 =$ _____

b) $7 \times 10 =$ _____

j) $3 \times 3 =$ _____

g) $64 \div 8 =$ _____

c) $5 \times 5 =$ _____

2. Divide.

h) $16 \div 2 =$ _____

d) $4 \times 6 =$ _____

a) $35 \div 5 =$ _____

i) $42 \div 7 =$ _____

e) $3 \times 7 =$ _____

b) $21 \div 3 =$ _____

j) $27 \div 9 =$ _____

f) $2 \times 9 =$ _____

c) $48 \div 6 =$ _____

g) $8 \times 4 =$ _____

d) $18 \div 3 =$ _____

h) $6 \times 6 =$ _____

e) $32 \div 4 =$ _____

Number Correct: _____ ✓

Time: _____ s

Skill Builder



NO CALCULATOR

1. What is the distance travelled for each of the following?

a) 3 h at 45 km/h

$$\begin{array}{r}
 45 \\
 \times 3 \\
 \hline
 \\
 \hline
 \end{array}$$

_____ km

b) 8 s at 25 m/s

_____ m

c) 5 min at 300 m/min

d) 4 h at 5000 m/h

e) 10 min at 8 km/min

f) 14 h at 8 km/h

2. Divide. (Use short division.)



NO CALCULATOR

a) $5 \overline{)55}$

b) $5 \overline{)550}$

c) $5 \overline{)5500}$

d) $5 \overline{)55\,500}$

e) $7 \overline{)63}$

f) $7 \overline{)630}$

g) $7 \overline{)6300}$

h) $7 \overline{)63\,000}$

i) $8 \div 4 = \underline{\quad}$

j) $80 \div 4 = \underline{\quad}$

k) $800 \div 4 = \underline{\quad}$

l) $8000 \div 4 = \underline{\quad}$

1.7 Problem Solving: Use a Data Bank

Use the *Data Bank* on pages 360 to 369 of the student text.



1. a) *State*

p. 363

i) the driving distance from Regina to Saint John. _____

p. 365

ii) the length of the Mackenzie River. _____

b) Which distance is longer?



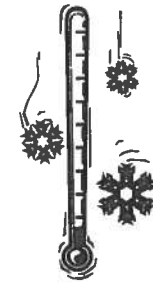
Sentence: _____

2. *Which feels colder?*

p. 364

an outside temperature of -29°C with a wind speed of 48 km/h
or

an outside temperature of -32°C with a wind speed of 40 km/h



Sentence: _____

3. a) What is the flying distance from Winnipeg to Ottawa? _____

p. 362

b) About how long does it take to fly from Winnipeg to Ottawa at a speed of 800 km/h?

$$\text{_____} \div 800 = \text{_____}$$



Sentence: _____

4. a) What is the flying distance from Toronto to Halifax? _____

p. 362

b) What is the driving distance from Toronto to Halifax? _____

p. 363

c) Find the difference between the flying distance and the driving distance.



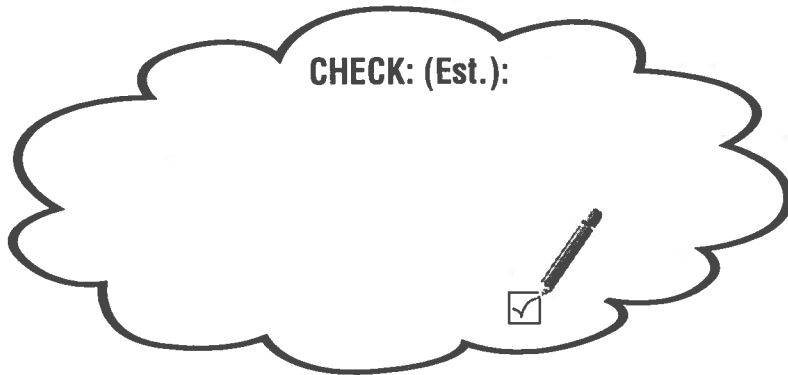
Sentence: _____

5. What is the **total** number of moons in our solar system?

p. 364

Planets	Number of Moons
Mercury	
Venus	
Earth	

Sentence: _____



Total = _____

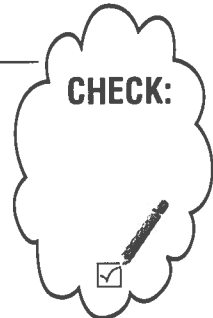
6. a) If a plane leaves Ottawa at 15:00, what time is it in Edmonton? _____

p. 360

b) A plane flies from Ottawa to Edmonton in about $3\frac{1}{2}$ hours.

If the plane leaves Ottawa at 15:00, at what time will it arrive in Edmonton?

Sentence: _____



7. The area of Alberta is 661 190 km². How many of the world's islands have a **larger area** than Alberta?

p. 365



Sentence: _____



8. One year on Earth is how many years on Mercury?

(Round your answer to the nearest hundredth.)

No. of days in a year on Earth.

No. of days for Mercury to orbit the sun.

_____ ÷ _____ = _____

Sentence: _____



Skill Builder

1. The multiplication table below contains mistakes. Shade in each box that contains a mistake. You will end up with an important mathematical symbol.



×	4	2	0	5	7	3	6	1
0	0	0	0	0	0	0	0	0
4	16	8	0	20	28	12	24	4
2	8	3	2	9	7	4	2	2
8	32	16	0	40	56	24	48	8
3	12	3	3	16	22	6	9	3
5	20	10	0	25	35	15	30	5
1	4	2	0	5	7	3	6	1

2. What number(s) will divide evenly into

Find the LCD.

No remainders!

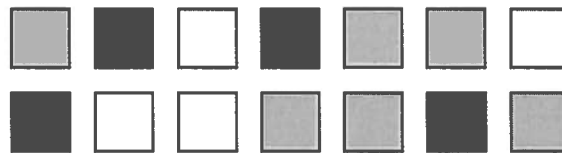
- a) 3, 6, and 9? _____ b) 4, 8, and 12? _____
 c) 6, 8, and 10? _____ d) 5, 10, and 15? _____
 e) 3, 4, and 7? _____

1.8 Ratios

Express all ratios in lowest terms.

Practice

1. Use the diagram to write the following ratios.



- a) grey squares to black squares to white squares _____
 b) white squares to grey squares to black squares _____

Is the ratio in lowest terms?

6. The following table shows the type and number of bills a cash register contains.

Type of bill	Number of bills
\$5 bills	12
\$10 bills	10
\$20 bills	6



What is the ratio of the number of \$5 bills to \$10 bills to \$20 bills?

Hint: \rightarrow 12: : = _____ : _____ : _____

Reduce!

Sentence: _____

7. Write as a ratio in simplest form.

a) 1 min to 30 s

: 30 = _____

1 min = s

b) 2 kg to 200 g

1 kg = 1000 g

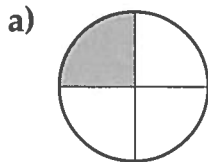
2 kg = g

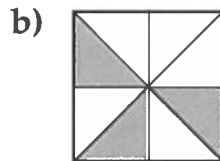
c) 40¢ to \$1.00 to 10¢

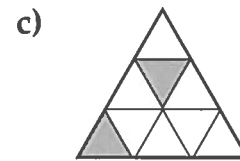
\$1 = ¢

Skill Builder

1. Write a fraction for each shaded part.







2. Calculate.



NO CALCULATOR

a) $2 + 4 + 7 + 3 =$ _____

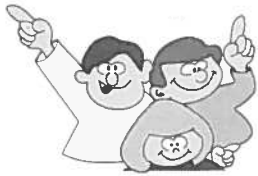
b) $8 + 3 - 1 + 2 =$ _____

c) $9 + 6 - 5 - 4 =$ _____

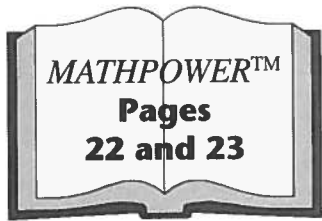
d) $6 - 2 - 2 + 7 + 3 =$ _____

e) $3 + 8 + 4 - 5 - 2 =$ _____

f) $5 + 4 - 3 - 2 + 6 =$ _____

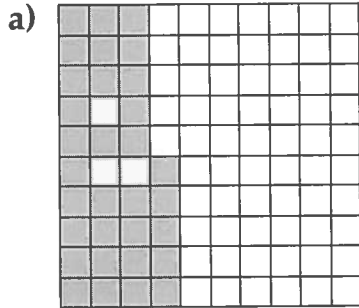


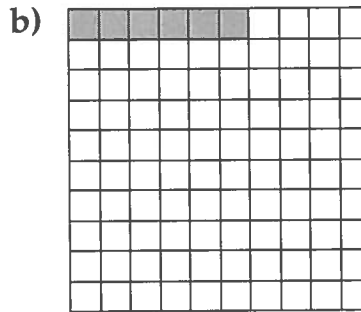
Work together with your classmates, using your *MATHPOWER*TM student text, pages 22 and 23.

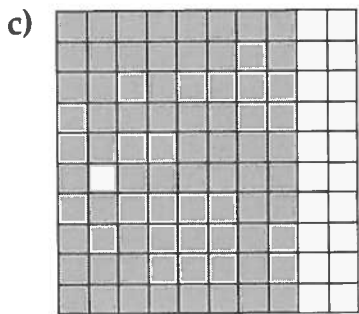


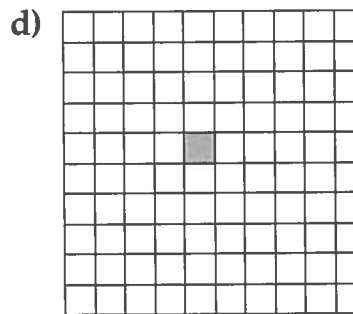
Skill Builder

1. What percent is shaded?











NO CALCULATOR

$$\frac{24}{4} = 24 \div 4 = \underline{\hspace{2cm}}$$

2. Divide.

a) $\frac{24}{4} = \underline{\hspace{2cm}}$

b) $\frac{240}{4} = \underline{\hspace{2cm}}$

c) $\frac{2800}{4} = \underline{\hspace{2cm}}$

d) $\frac{2800}{40} = \underline{\hspace{2cm}}$

e) $\frac{54}{6} = \underline{\hspace{2cm}}$

f) $\frac{540}{6} = \underline{\hspace{2cm}}$

g) $\frac{5400}{6} = \underline{\hspace{2cm}}$

h) $\frac{540}{60} = \underline{\hspace{2cm}}$

i) $\frac{6300}{9} = \underline{\hspace{2cm}}$

j) $\frac{4200}{60} = \underline{\hspace{2cm}}$

k) $\frac{18\ 000}{900} = \underline{\hspace{2cm}}$

l) $\frac{30\ 000}{500} = \underline{\hspace{2cm}}$

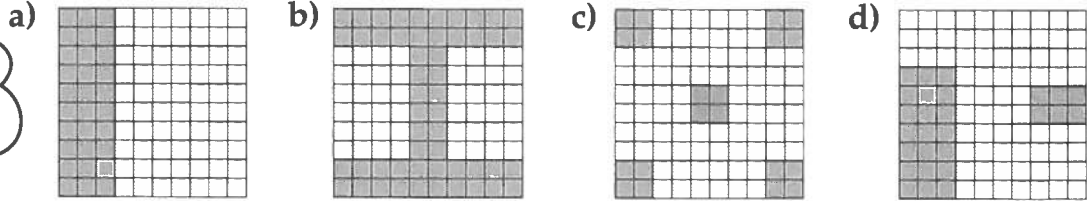
1.9 Percents

A **percent** is a fraction with a denominator of 100.

Practice

1. State the shaded part of each figure as a percent.

Don't forget the percent sign (%).



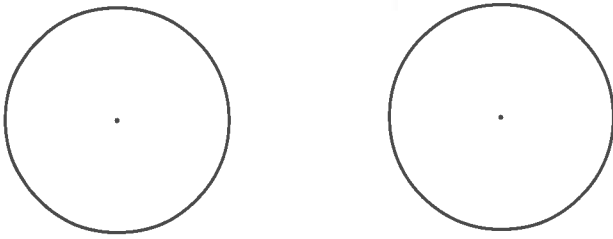
$\frac{\square}{100} = \underline{\hspace{2cm}}\% \quad \underline{\hspace{2cm}} \quad \underline{\hspace{2cm}} \quad \underline{\hspace{2cm}}$

2. Complete the table.

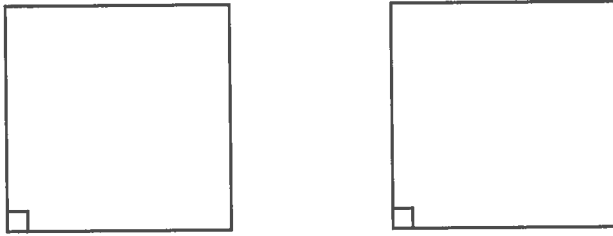
Figure	Shaded Part as a Fraction	Fraction out of 100	Percent Shaded	Percent <i>not</i> Shaded
a)	$\frac{\bigcirc}{4}$	$\frac{\bigcirc \times 25}{4 \times 25} = \frac{\square}{100}$	$\square\%$	$100\% - \square = \underline{\hspace{2cm}}\%$
b)				
c)				
d)				
e)				
f)				

3. Draw each of the following in 2 different ways. (Use a ruler.)

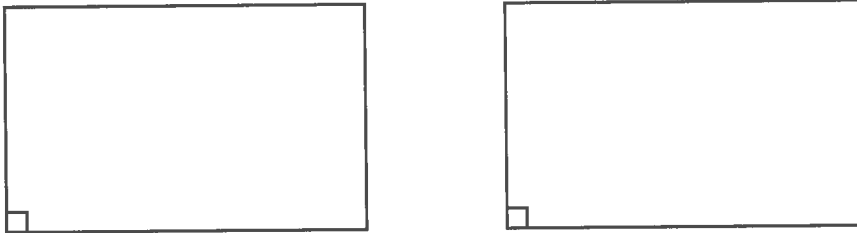
a) a circle with 50% shaded



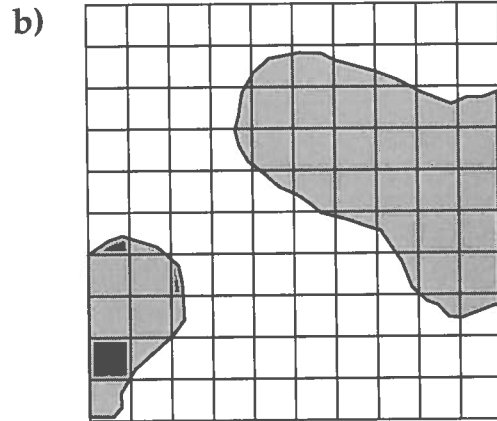
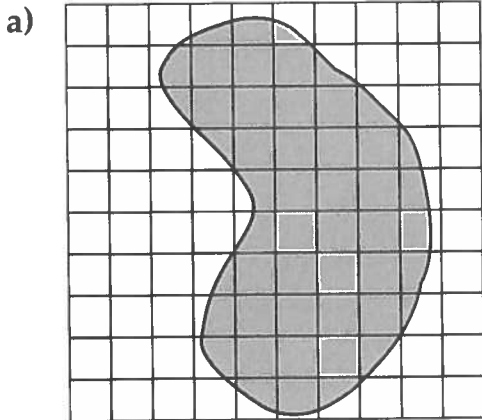
b) a square with 25% shaded



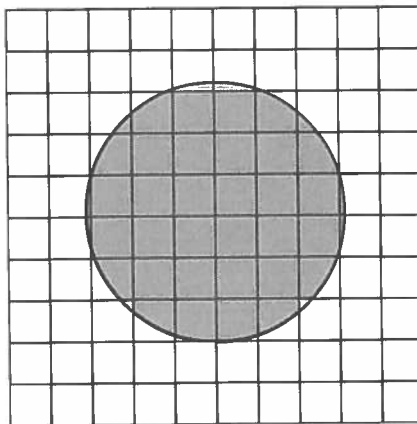
c) a rectangle with 75% shaded



4. Estimate the percent shaded.

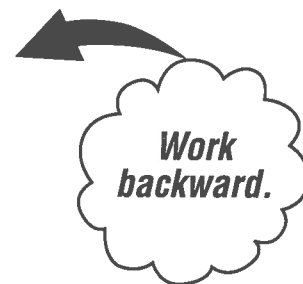


c)



5. Complete the table.

	Fraction	Out of 100	Percent
a)	$\frac{1}{20}$	$\frac{1 \times 5}{20 \times 5} = \frac{\square}{100}$	
b)	$\frac{7}{5}$	$\frac{7 \times 20}{5 \times \bigcirc} = \frac{\square}{100}$	
c)	$\frac{8}{50}$		
d)	$\frac{7}{10}$		
e)	$\frac{88}{100 \div 4} = \frac{\square}{25}$	$\frac{\square}{100}$ ←	88%
f)		$\frac{\square}{100}$ ←	60%
g)			44%
h)			84%
i)			110%



6. Write as a percent.

a) $\frac{7}{10} = \frac{7 \times 10}{10 \times 10}$

$= \frac{\square}{100}$

$= \underline{\hspace{2cm}} \%$

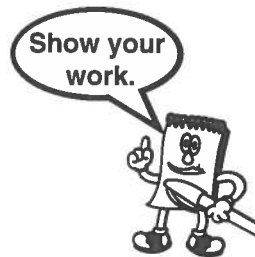
b) $\frac{1}{50}$

c) $\frac{24}{25}$

d) $\frac{9}{20}$

e) $\frac{3}{4}$

f) $\frac{30}{50}$



g) $\frac{5}{4}$

h) 1

i) $\frac{12}{20}$

7. Complete the table.

Fraction	Fraction in Lowest Terms	Fraction out of 100	Percent
a) $\frac{12}{15}$	$\frac{12 \div 3}{15 \div 3} = \frac{\boxed{}}{5}$	$\frac{4 \times 20}{5 \times 20} = \frac{\boxed{}}{100}$	_____ %
b) $\frac{9}{12}$			
c) $\frac{7}{14}$			
d) $\frac{4}{16}$			
e) $\frac{18}{24}$			
f) $\frac{7}{35}$			
g) $\frac{16}{10}$			
h) $\frac{1}{2}$			
i) $\frac{12}{24}$			
j) $\frac{15}{20}$			

Problems and Applications

Show your work.



8. Around the world, 17 out of 20 people have brown eyes. What percent of the world's population has brown eyes?

Hint: $\longrightarrow \frac{17 \times \underline{\hspace{2cm}}}{20 \times \underline{\hspace{2cm}}} = \frac{\square}{100}$
 $= \underline{\hspace{2cm}}\%$

Sentence: _____

9. a) About $\frac{9}{25}$ of Canada is covered by forests. What percent of Canada is covered by forests?

Sentence: _____

- b) What percent of Canada is **not** covered by forests?

Sentence: _____

10. List different ways percent is used.

Skill Builder

*When you multiply by 0.1, 0.01, or 0.001, move the decimal to the **left**. When you divide by 0.1, 0.01, or 0.001, move the decimal to the **right**.*

1. Calculate.

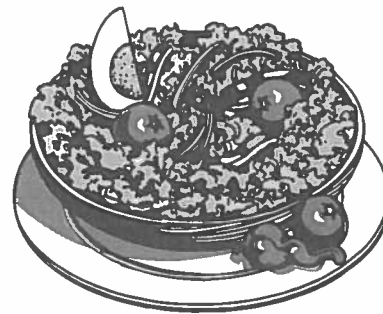
- a) $740 \times 0.01 = \underline{\hspace{2cm}}$ b) $740 \times 0.001 = \underline{\hspace{2cm}}$ c) $740 \times 0.1 = \underline{\hspace{2cm}}$
 d) $740 \div 0.001 = \underline{\hspace{2cm}}$ e) $740 \div 0.1 = \underline{\hspace{2cm}}$ f) $740 \div 0.01 = \underline{\hspace{2cm}}$
 g) $603 \times 0.001 = \underline{\hspace{2cm}}$ h) $603 \times 0.1 = \underline{\hspace{2cm}}$ i) $603 \times 0.01 = \underline{\hspace{2cm}}$
 j) $603 \div 0.01 = \underline{\hspace{2cm}}$ k) $603 \div 0.001 = \underline{\hspace{2cm}}$ l) $603 \div 0.1 = \underline{\hspace{2cm}}$

2. Find the message.

" 14% 60% 4% 4% 55% 70% 60% 30% 14% 98% 25% 60% "

please."

To find out what type of salad people like when they want some privacy, complete the following table and put the right letter with the answer above.



Fraction	Equivalent Fraction out of 100	Percent
$\frac{3}{5}$	$\frac{3 \times \underline{\quad}}{5 \times \underline{\quad}} = \frac{\square}{100}$	E
$\frac{3}{10}$		A
$\frac{1}{4}$		N
$\frac{7}{50}$		L
$\frac{11}{20}$		U
$\frac{1}{25}$		T
$\frac{49}{50}$		O
$\frac{7}{10}$		C

Mental Math

Multiply.

a) $3 \times 3 = \underline{\quad}$

b) $8 \times 8 = \underline{\quad}$

c) $6 \times 6 = \underline{\quad}$

d) $6 \times 5 = \underline{\quad}$

e) $8 \times 4 = \underline{\quad}$

f) $4 \times 4 = \underline{\quad}$

g) $3 \times 9 = \underline{\quad}$

h) $9 \times 9 = \underline{\quad}$

i) $7 \times 2 = \underline{\quad}$



NO CALCULATOR

Number Correct: _____

1.10 Ratios, Fractions, Decimals, and Percents

Practice

1. Write each decimal as a percent.

a) $0.38 = \frac{\square}{100}$

$= \underline{\hspace{2cm}} \%$

b) 0.44

c) 0.4

d) 0.8

e) 0.327

f) 0.125

2. Write each fraction as a percent.

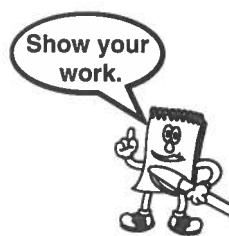
a) $\frac{6}{25} = \frac{6 \times 4}{25 \times 4}$

$= \frac{\square}{100}$

$= \underline{\hspace{2cm}} \%$

b) $\frac{3}{50}$

c) $\frac{22}{20}$



3. Write each fraction as a percent.

a) $\frac{26}{40} = 26 \div 40$

$= 0.65$

$= \underline{\hspace{2cm}} \%$

b) $\frac{6}{30}$

c) $\frac{9}{18}$

d) $\frac{1}{8}$

e) $\frac{44}{40}$

f) $\frac{18}{24}$

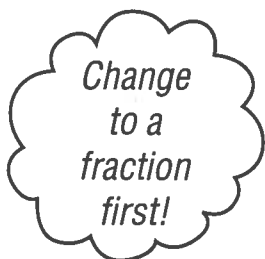
4. Express each ratio as a percent.

a) 1:4

b) 3:8

c) 9:45

$\frac{1}{4} =$



d) 1:5

e) 7:10

f) 7:5

5. Write as a *percent*. Round each answer to the nearest tenth.

Example:

$$\begin{aligned}\frac{2}{3} &= 2 \div 3 \\ &= 0.666... \\ &= 66.7\%\end{aligned}$$

a) $\frac{1}{3}$

b) 2:11

c) 15:55

d) $\frac{4}{7}$

e) $\frac{2}{9}$

f) 5:9

6. Write each as a *decimal*.

a) $18\% = \frac{18}{100}$

b) 3%

c) 17%

d) 5%

= _____

e) 77%

f) $125\% = \frac{125}{100}$

g) 289%

h) 143%

= 1. _____

i) $85.9\% = \frac{85.9}{100}$

j) 33.3%

k) 89.7%

l) 68.3%

= 0. _____

7. Replace each \bigcirc with $>$, $<$, or $=$ to make each statement true.



Hint: Change all percents or fractions to a decimal first.

a) $0.01 \bigcirc 10\%$

b) $\frac{3}{5} \bigcirc 65\%$

$0.01 \bigcirc 0.1$

$>$ means greater than
 $<$ means less than

c) $\frac{35}{50} \bigcirc 35\%$

d) $0.05 \bigcirc 50\%$

e) $17:20 \bigcirc 85\%$

f) $1.8 \bigcirc 170\%$

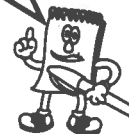
Problems and Applications

8. About $\frac{1}{50}$ of Earth's water is frozen in ice caps and glaciers.

Write this fraction as a percent.

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

Show your work.



Sentence: _____

9. The mass of a table tennis ball is 2.5 g. Its mass is 0.1 of the mass of a golf ball.

Write each decimal as a percent and as a fraction.

Sentence: _____

10. The table shows the make-up of the human body, by mass.

Complete the table.

Part	Fraction (lowest terms)	Equivalent Fraction out of 100	Decimal	Percent
a) Muscles	$\frac{11}{25}$	$\frac{11 \times \underline{\quad}}{25 \times \underline{\quad}} = \frac{\square}{100}$		
b) Fat			0.12	
c) Bones				16%
d) Internal Organs	$\frac{1}{5}$			
e) Blood			0.08	

Skill Builder

1. Write each fraction as a decimal. Round to 2 decimal places.



a) $\frac{2}{3} = \underline{\hspace{2cm}}$

b) $\frac{1}{4} = \underline{\hspace{2cm}}$

c) $\frac{1}{3} = \underline{\hspace{2cm}}$

d) $\frac{3}{4} = \underline{\hspace{2cm}}$

e) $\frac{1}{6} = \underline{\hspace{2cm}}$

f) $\frac{1}{8} = \underline{\hspace{2cm}}$

2. Match each power with its value.

a) 3^2 _____ 64

b) 7^2 _____ 25

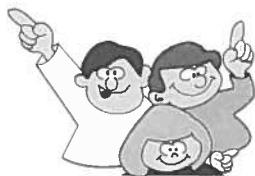
c) 5^2 _____ 121

d) 8^2 _____ 9

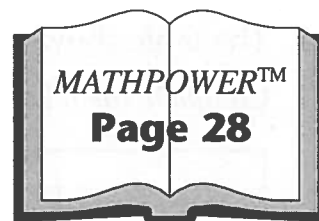
e) 6^2 _____ 36

f) 11^2 _____ 49

Hint:
 $3^2 = 3 \times 3$
 = 9



Work together with your classmates, using your *MATHPOWER™* student text, page 28.



Skill Builder



1. What are the missing numbers?

a) $9 \times \square = 81$

b) $6 \times \square = 36$

c) $8 \times \square = 64$

d) $5 \times \square = 25$

e) $3 \times \square = 9$

f) $7 \times \square = 49$

g) $4 \times \square = 32$

h) $8 \times \square = 56$

i) $9 \times \square = 54$

2. Multiply.

a) $5 \times 4 = \underline{\hspace{2cm}}$

b) $5 \times 40 = \underline{\hspace{2cm}}$

c) $50 \times 400 = \underline{\hspace{2cm}}$

d) $3 \times 6 = \underline{\hspace{2cm}}$

e) $3 \times 60 = \underline{\hspace{2cm}}$

f) $300 \times 60 = \underline{\hspace{2cm}}$

g) $4 \times 10 = \underline{\hspace{2cm}}$

h) $4 \times 1000 = \underline{\hspace{2cm}}$

i) $40 \times 1000 = \underline{\hspace{2cm}}$

j) $8 \times 8 = \underline{\hspace{2cm}}$

k) $800 \times 8 = \underline{\hspace{2cm}}$

l) $800 \times 80 = \underline{\hspace{2cm}}$

1.11 Squares and Square Roots

Practice



1. Evaluate.

a) $\sqrt{4} = \underline{\hspace{2cm}}$

b) $\sqrt{36} = \underline{\hspace{2cm}}$

c) $\sqrt{100} = \underline{\hspace{2cm}}$

d) $\sqrt{25} = \underline{\hspace{2cm}}$

e) $\sqrt{81} = \underline{\hspace{2cm}}$

f) $\sqrt{1} = \underline{\hspace{2cm}}$

g) $\sqrt{49} = \underline{\hspace{2cm}}$

h) $\sqrt{64} = \underline{\hspace{2cm}}$

2. Use your calculator to find the square root of each number.

a) $\sqrt{400} = \underline{\hspace{2cm}}$

b) $\sqrt{144} = \underline{\hspace{2cm}}$

c) $\sqrt{256} = \underline{\hspace{2cm}}$



Press \square C 400 \square

d) $\sqrt{625} = \underline{\hspace{2cm}}$

e) $\sqrt{4.84} = \underline{\hspace{2cm}}$

f) $\sqrt{0.81} = \underline{\hspace{2cm}}$

g) $\sqrt{1.69} = \underline{\hspace{2cm}}$

h) $\sqrt{0.25} = \underline{\hspace{2cm}}$

i) $\sqrt{169} = \underline{\hspace{2cm}}$

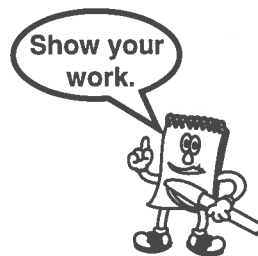
3. Complete the table.

Estimate the square root.	Find the square root.	Round the answer to the nearest tenth.
a) $\sqrt{92} \doteq \underline{10}$	$\sqrt{92} = 9.59166 \dots$	9.6
b) $\sqrt{60} \doteq$	$\sqrt{60} =$	
c) $\sqrt{110} \doteq$	$\sqrt{110} =$	
d) $\sqrt{20} \doteq$	$\sqrt{20} =$	
e) $\sqrt{45} \doteq$	$\sqrt{45} =$	
f) $\sqrt{10} \doteq$	$\sqrt{10} =$	
g) $\sqrt{0.8} \doteq$	$\sqrt{0.8} =$	
h) $\sqrt{0.12} \doteq$	$\sqrt{0.12} =$	

Problems and Applications

4. List the perfect squares from 1 to 100.

Example: **49** is a perfect square.
 $7 \times 7 = \mathbf{49}$



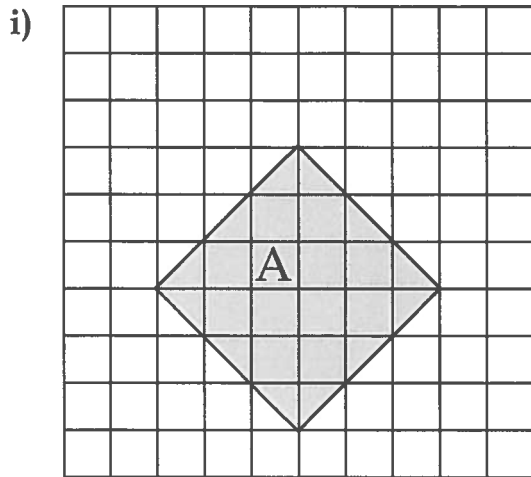
Sentence: _____

5. Prince Edward Island is Canada's smallest province. It has an area of 5660 km². What is the square root of its area, to the nearest whole number of kilometres?

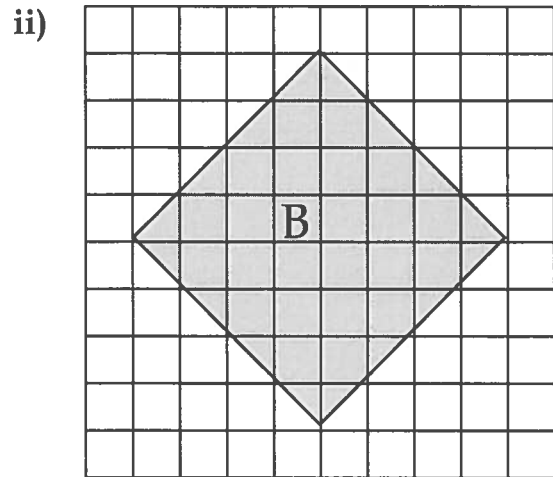


Sentence: _____

6. a) Count the squares to find the area of each figure.



A = _____ units²



B = _____ units²

b) Use your calculator, to find the square root of each area above.

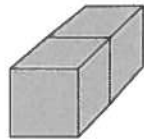
i)
For a square,
 \sqrt{A} = length
of side.

The length of the side of
square A is _____ units.

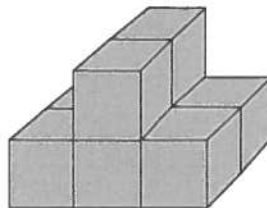
ii) _____



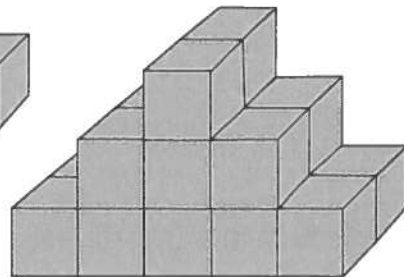
These three models are built with connecting cubes.



Model 1



Model 2



Model 3

Use cubes and build Model 4.
How many cubes are in Model 4?

Skill Builder



1. Calculate.

a) $3 + 16 \div 2$

$= 3 + \square$

Do division first.

$= \underline{\quad}$

Add

b) $10 \div (6 + 4)$

$= \underline{\quad}$

Brackets

$= \underline{\quad}$

Division

c) $4^2 + 3 - 4$

Exponents

Add

S

d) $(7 - 2) + 3^2 - 1$

Cloud shapes for working out problem d)

e) $3 \times 7 - 2 \div 2$

Cloud shapes for working out problem e)

BEDMAS

B → Brackets

E → Exponents

D → Division

M → Multiplication

A → Addition

S → Subtraction

Do in the order they appear.

Do in the order they appear.

2. Give in standard form.

a) $(4 \times 1000) + (3 \times 100) + (2 \times 10) = \underline{\quad}$

b) $(2 \times 100) + (7 \times 1) = \underline{\quad}$

c) $2 \times 1000 + 1 \times 100 + 8 \times 1 = \underline{\quad}$

d) $8 \times 100 + 4 \times 10 + 8 \times 1 = \underline{\quad}$

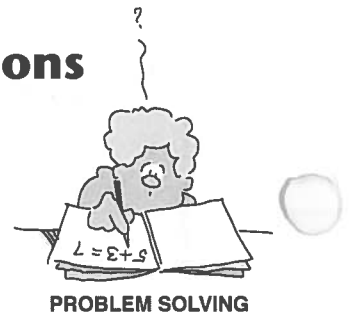
e) $6 \times 10 + 8 \times 1 + 4 \times 0.1 = \underline{\quad}$

f) $5 \times 100 + 2 \times 1 + 3 \times 0.1 + 2 \times 0.01 = \underline{\quad}$

g) $9 \times 1000 + 7 \times 0.1 = \underline{\quad}$

h) $7 \times 10 + 4 \times 1 + 5 \times 0.001 = \underline{\quad}$

1.12 Problem Solving: Sequence the Operations



Understand the Problem

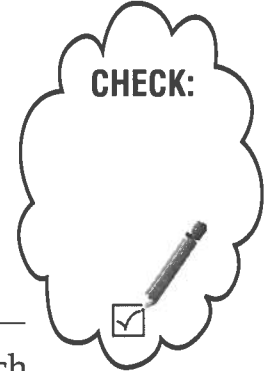
- The football stadium has 32 560 seats. For the last game, 4500 tickets were given away.
 - How many tickets were left?

Facts: _____ , _____

Plan:



CHECK:



Sentence: _____

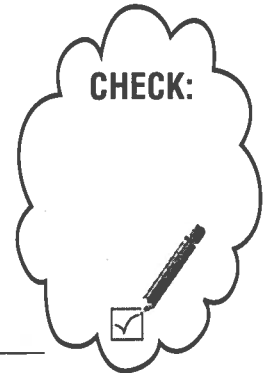
- The tickets that were left were sold at \$9.50 each. How much money was received from ticket sales?

Facts: _____ , _____

Plan:



CHECK:



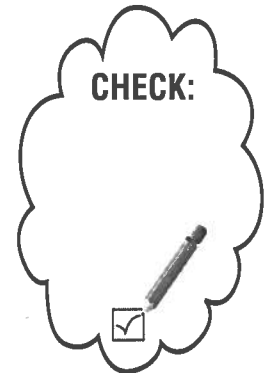
Sentence: _____

- The school library had a used-book sale. Paperback books were \$0.25 each, and hardcover books were \$1.25 each. It sold 54 paperbacks and 163 hardcover books. How much money did the library raise?

Facts: _____ , _____
 _____ , _____

Plan:

CHECK:



Sentence: _____

Think of a Plan

Carry Out the Plan

Look Back

3. Paula repairs swimming pools and earns \$14.50/h for the first 35 h she works in a week. If she works overtime, she earns 1.5 **times** as much. If she works 40 h in a week, how much does she earn?

Facts: _____ , _____
_____ , _____

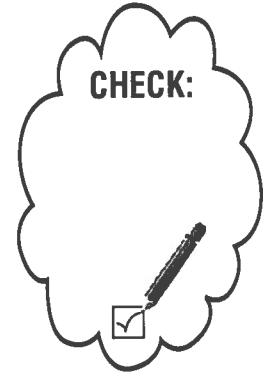
Plan: Hours overtime: $40 - 35 = \square$
Overtime pay for 1 h: $\$14.50 \times 1.5 = \square$

Total overtime pay: _____

Pay for first 35 h: _____

Total earnings: _____

Sentence: _____

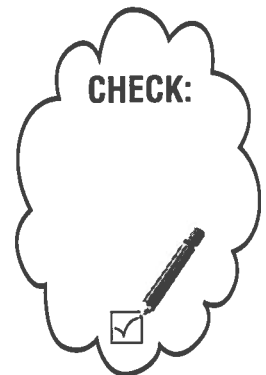


4. For fundraising, the grade 8 students sold popcorn for 50¢ a bag and chocolate bars for 85¢ each. If they sold 32 bags of popcorn and 47 chocolate bars, how much did they make altogether?

Facts: _____ , _____
_____ , _____

Plan:

Sentence: _____



5. A sporting-goods store was having a "Back-to-School Sale," with **no** G.S.T. What is the total cost of 4 pairs of socks, one pair of shoes, and 2 pairs of gym shorts?

Back-to-School Sale		
		
<p>Running Shoes \$59.95/pair</p>	<p>Sports Socks 2 pairs for \$7.95</p>	<p>Gym Shorts \$12.95 each</p>

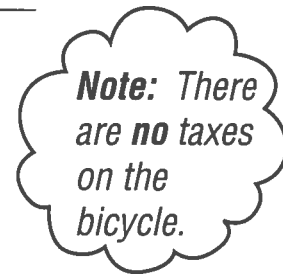
Facts: _____ , _____
 _____ , _____

Plan:



Sentence: _____

6. You can buy a bicycle for \$399.95 cash *or* pay \$34.90/month for 12 months. Which price is less and by how much?



Facts: _____

Plan:

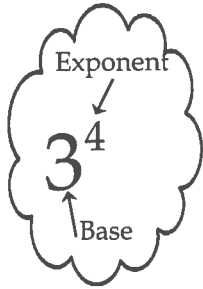


Sentence: _____

Review



1. Complete the table.



Power	Base	Exponent	Expanded Form	Standard Form
a) 3^4			$3 \times 3 \times 3 \times 3$	
b) 5^3				
c)			$4 \times 4 \times 4$	
d) 7^1				
e)			$10 \times 10 \times 10 \times 10 \times 10$	
f)	1	5		
g)			$2 \times 2 \times 2 \times 2 \times 2$	
h)			$6 \times 6 \times 6$	

2. Write in standard form.



a) $4 \times 2 \times 8 = \underline{\hspace{2cm}}$

b) $5^4 = \underline{\hspace{2cm}}$

c) $2 \times 2 \times 2 \times 3 \times 3 = \underline{\hspace{2cm}}$

d) $2^3 \times 5^2 = \underline{\hspace{2cm}}$

3. Write in order from smallest to largest.

a) $3^4, 5^3, 10^2$

b) $11^2, 4^3, 2^6$

$3^4 = 3 \times 3 \times 3 \times 3$
 $= 81$

$5^3 = \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

$10^2 = \underline{\hspace{2cm}}$

4. Simplify. Leave your answer in exponential form.

a) $5^2 \times 5^3 = 5^{2+3}$
 $= 5^{\square}$

b) $2^4 \times 2^2 = \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

c) $3^6 \times 3^4 = \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

d) $8^1 \times 8^3 = \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

5. Simplify. Leave your answer in exponential form.

a) $3^9 \div 3^3 = 3^{9-3}$

$= 3^{\square}$

b) $2^6 \div 2^3 = \underline{\hspace{2cm}}$

$= \underline{\hspace{2cm}}$

c) $7^6 \div 7^2 = \underline{\hspace{2cm}}$

$= \underline{\hspace{2cm}}$

d) $5^6 \div 5^3 = \underline{\hspace{2cm}}$

$= \underline{\hspace{2cm}}$

6. Rewrite each number in scientific notation.

Example: $78\ 000 = 7.8 \times 10^4$

a) $24\ 000 = \underline{\hspace{2cm}}$

b) $360\ 000 = \underline{\hspace{2cm}}$

c) $5\ 800\ 000 = \underline{\hspace{2cm}}$

d) $6\ 300 = \underline{\hspace{2cm}}$

7. Rewrite each in standard form.

Example: $9.64 \times 10^5 = 964\ 000$

a) $2.6 \times 10^4 = \underline{\hspace{2cm}}$

b) $8.31 \times 10^7 = \underline{\hspace{2cm}}$

c) $1.7 \times 10^5 = \underline{\hspace{2cm}}$

d) $6.45 \times 10^2 = \underline{\hspace{2cm}}$

8. Rewrite each number in scientific notation.

Example: $0.036 = 3.6 \times 10^{-2}$

a) $0.000\ 63 = \underline{\hspace{2cm}}$

b) $0.0052 = \underline{\hspace{2cm}}$

c) $0.047 = \underline{\hspace{2cm}}$

d) $0.000\ 046 = \underline{\hspace{2cm}}$

9. Rewrite each in standard form.

Example: $2.8 \times 10^{-4} = 0.000\ 28$

a) $4.3 \times 10^{-3} = \underline{\hspace{2cm}}$

b) $8.902 \times 10^{-6} = \underline{\hspace{2cm}}$

c) $2 \times 10^{-4} = \underline{\hspace{2cm}}$

d) $5.13 \times 10^{-5} = \underline{\hspace{2cm}}$

10. Write each of the following as a fraction in lowest terms.

a) $0.6 = \frac{6 \div \underline{\hspace{1cm}}}{10 \div \underline{\hspace{1cm}}}$

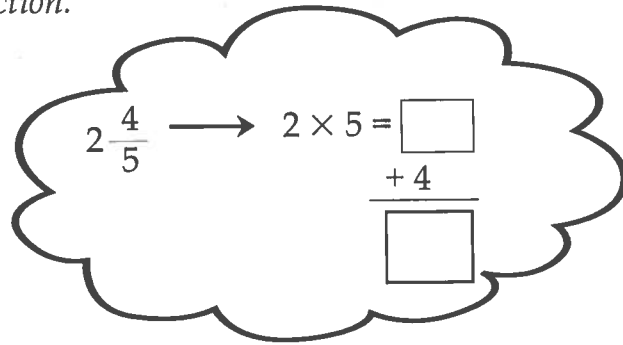
b) 0.5

c) -0.2

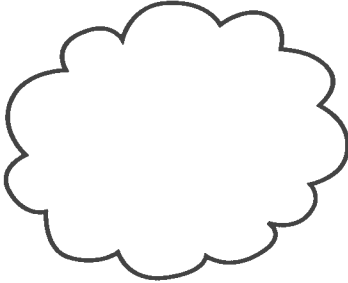
$= \square$

11. Write each mixed number as a fraction.

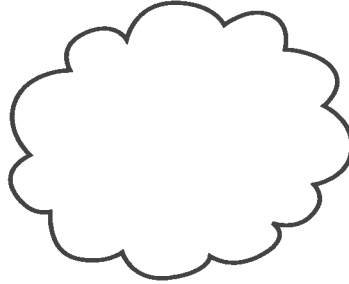
a) $2\frac{4}{5} = \frac{\square}{5}$



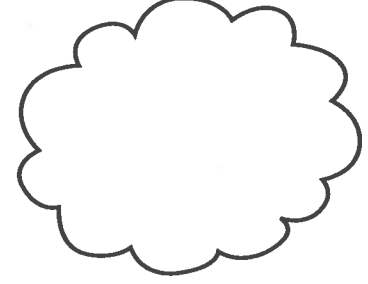
b) $1\frac{2}{3}$



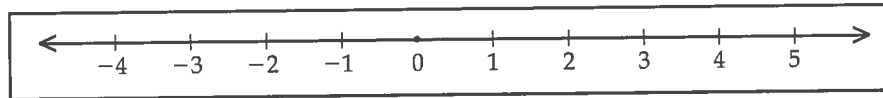
c) $-3\frac{1}{4}$



d) $-6\frac{1}{2}$



12. Write in order from *smallest to greatest*.



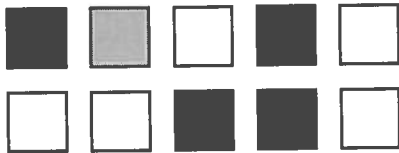
a) 15.5, -17, -9.2, 10.9, 5.2

b) 1.8, -1.5, 2.9, 1.83, 0, -0.91, 15.8

c) $\frac{1}{4}$, -1, 2.5, $1\frac{1}{2}$, 4

Change the fractions to decimals.

13. Use the diagrams to express each ratio in 2 ways.



Ratios:
 $1:2, \frac{1}{2}, 1 \text{ to } 2$

Ratios must be in lowest terms.

a) white squares to grey squares

b) black squares to **all** squares

c) grey squares to black squares to white squares

14. Express in lowest terms.

Change to a fraction first.

a) 3:9

$$\frac{3 \div \underline{\quad}}{9 \div \underline{\quad}} = \frac{\square}{\square}$$

$\square : \square$

b) 3:3

c) 4:8

d) 40:5

e) 12:3

f) 50:10

What number will divide into all 3 numbers?

g) 4:6:2

$\div 2$

= 2: \square :1

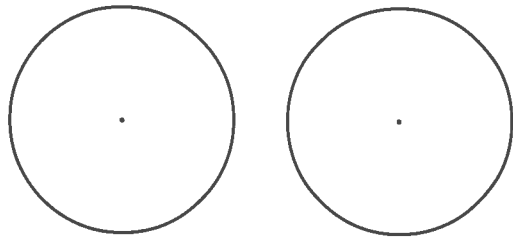
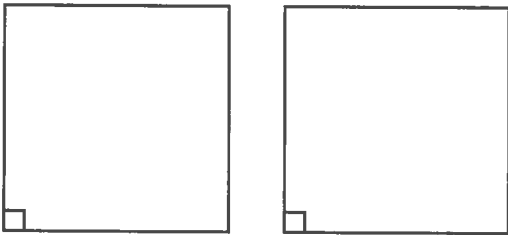
h) 20:5:15

i) 9:12:6

15. Draw each of the following in 2 different ways.

a) a square with 50% shaded

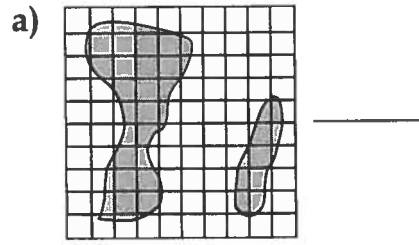
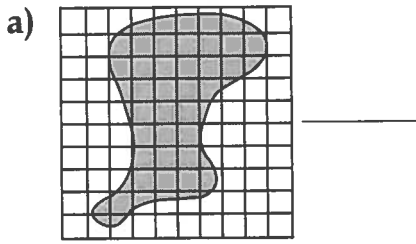
b) a circle with 75% shaded



Hint: $50\% = \frac{50 \div 50}{100 \div 50}$
 $= \frac{\square}{2}$

75% =

16. Estimate the percent that is shaded.



17. Express as a decimal.

a) 20% = _____

b) 99% = _____

c) 168% = _____

d) 289% = _____

e) 35.8% = _____

f) 67.5% = _____

18. Express as a fraction in lowest terms.

a) $10\% = \frac{\square}{100} \div \frac{\square}{\square}$

b) 60%

c) 2%

Reduce.
=

d) 25%

e) 50%

f) 125%

19. Write as a percent.

a) 0.83 = _____ %

b) 0.4 = _____ c) 0.67 = _____

d) 1.32 = _____

e) 0.125 = _____ f) 2.91 = _____

g) $\frac{2}{5} = \frac{\square}{100}$

h) $\frac{6}{10} =$

i) $\frac{11}{20} =$

= _____ %

20. Express to the nearest tenth of a percent.



a) $\frac{2}{3} =$ _____

b) $\frac{4}{9} =$ _____

c) $\frac{3}{7} =$ _____

Press: $\boxed{C} \ 2 \ \boxed{\div} \ 3 \ \boxed{\%} \ \rightarrow 66.\bar{6}\%$

$\frac{2}{3} = 66.7\%$

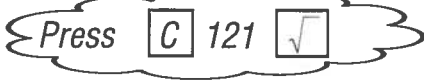
21. Evaluate.



a) $\sqrt{121} =$ _____

b) $\sqrt{900} =$ _____

c) $\sqrt{0.49} =$ _____



d) $\sqrt{0.04} =$ _____

e) $\sqrt{441} =$ _____

f) $\sqrt{1.96} =$ _____

22. A microsecond is 0.000 001 s. Write this number in **scientific notation**.

23. Mrs. Eto's grade 8 class has 12 boys and 18 girls. Write each ratio.

a) boys to girls

b) girls to all the students in Mrs. Eto's class



24. Write the next 3 numbers.

a) 2, 4, 8, _____, _____, _____.

b) 2, 7, 12, 17, _____, _____, _____.

c) 29, 27, 25, _____, _____, _____.

d) 90, 80, 70, _____, _____, _____.



1. What is the date 5 days later?

a) June 3, 1985 _____

b) August 31, 1998 _____

2. What is the date 2 days earlier?

a) May 29, 1991 _____

b) September 1, 1998 _____

3. If New Year's Day is on a Monday, on which day of the week is Valentine's Day?



Chapter Check



1. Complete the table.



Expanded Form	Power	Standard Form
a) $3 \times 3 \times 3 \times 3$	3^4	81
b) $4 \times 4 \times 4$		
c) $10 \times 10 \times 10 \times 10 \times 10$		
d) $2 \times 2 \times 2 \times 2 \times 2$		
e) $6 \times 6 \times 6$		

2. Write in scientific notation.

Example: $24\ 000 = 2.4 \times 10^4$

a) $52\ 000 =$ _____

b) $270\ 000 =$ _____

c) $6150 =$ _____

3. Write in scientific notation.

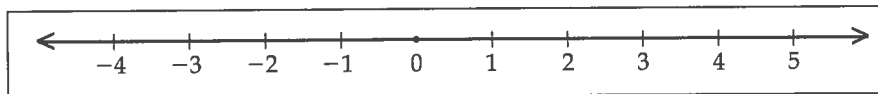
Example: $0.0063 = 6.3 \times 10^{-3}$

a) $0.058 =$ _____

b) $0.0007 =$ _____

c) $0.001\ 13 =$ _____

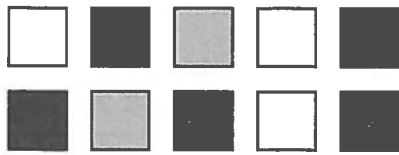
4. Arrange the numbers in order from *smallest* to *largest*.



Change the fractions to decimals.

$0.5, \frac{3}{4}, 5.1, -5, 1, -3.2$

5. Use the diagrams to write each ratio in lowest terms.



Ratio:
4:3

a) grey squares to black squares

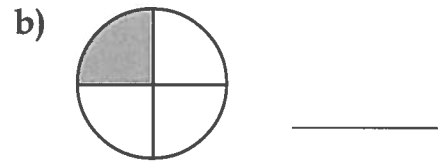
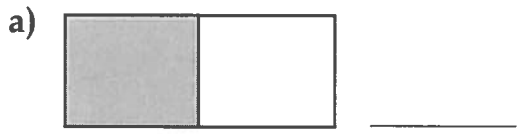
b) white squares to grey squares

c) grey squares to white squares to black squares

d) white squares to **all** squares

Reduce!

6. What **percent** of each figure is **shaded**?



7. Match the following so that they are **equal**.

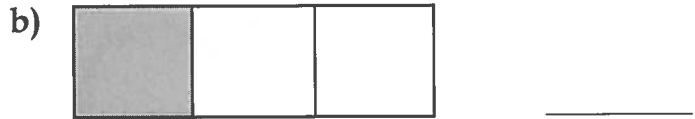
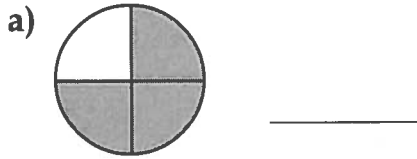
- a) $\frac{41}{100}$ b) 0.5 c) $1\frac{1}{4}$ d) 0.095 e) 2.55 f) 0.95 g) 0.05

_____ 125%, _____ 95%, _____ 255%, _____ 41%, _____ 50%, _____ 5%, _____ 9.5%

8. Complete the table.

Percent	Decimal	Fraction out of 100	Equivalent Fraction in Lowest Terms
a) 80%			
b) 45%			
c) 50%			
d) 25%			
e) 120%			

9. Estimate the **percent** of each figure that is shaded.



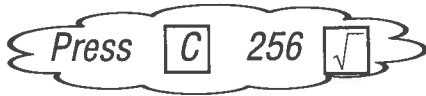
10. Find the **square root**.

a) $\sqrt{256}$

b) $\sqrt{0.16}$

c) $\sqrt{100}$

d) $\sqrt{1.69}$



11. The largest mammal is the blue whale. It can grow to about 150 000 kg. Write this number in **scientific notation**.



Hint: See #2.

12. There are 6 cities in New Brunswick, 12 cities in Saskatchewan, and 16 cities in Alberta. Write **each ratio in lowest terms**.

*Ratio:
4:3*

Change to a fraction and reduce.

a) cities in New Brunswick to cities in Saskatchewan

b) cities in New Brunswick to cities in Alberta

c) cities in New Brunswick to cities in Saskatchewan to cities in Alberta

: 12 :

*Reduce!
What number will divide into each number?*

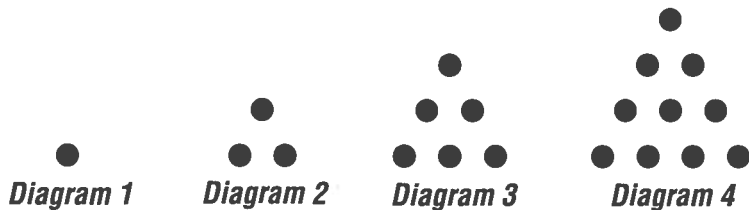
Problem Solving: Using the Strategies



1. Look for a pattern and write the next 3 terms.

- a) 1, 7, 13, 19, _____, _____, _____.
- b) 1, 2, 4, 8, 16, _____, _____, _____.
- c) 50, 45, 40, 35, _____, _____, _____.
- d) 3, 6, 9, 12, _____, _____, _____.
- e) b, d, f, h, _____, _____, _____.

2. Count the number of dots in each diagram.



- a) Draw the next 3 diagrams.
- b) Describe the pattern.
- c) Write the next 5 numbers of the pattern.

1, 3, 6, _____, _____, _____, _____, _____.

3. Tia had \$80.00 to spend. She went to a store that had **no** taxes for the day. She bought a sweater for \$49.95 and a gym bag for \$24.79. How much change did she have left?



4. Terry is a bellhop at a hotel. He earns \$15.25/h for the first 35 h worked in a week. For the hours he works over the 35 h, he gets \$17.50/h. If Terry works 40 h a week, how much will he earn?



5. The table gives the **sums** of odd numbers.

Complete the table.



First one	$1 = 1$
First two	$1 + 3 = 4$
First three	$1 + 3 + 5 = 9$
First four	$1 + 3 + 5 + 7 = \square$
First five	$1 + 3 + 5 + 7 + 9 = \square$
First six	

Describe the pattern.

DATA BANK

*Use the Data Bank on pages 360 to 369
of your MATHPOWER™ student text.*

See
p. 365

1. a) What is the name of Canada's longest river?

- b) How long is it? _____

- c) The Nile is the world's longest river. It is 6695 km in length. How much longer is it than Canada's longest river?

See
p. 362

2. a) What is the flying distance between Edmonton and Ottawa?

- b) If you flew at 800 km/h, how long would it take to fly from Edmonton to Ottawa?

See
p. 364

3. How long does it take the planet Mercury to orbit the sun?



