

CHAPTER

2

Operations With Rational Numbers

GETTING STARTED

Warm Up

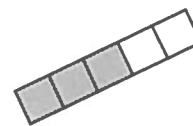
- 2.1 Problem Solving: Solve a Simpler Problem
- 2.2 Adding Fractions
- 2.3 Subtracting Fractions
- 2.4 Problem Solving: Work Backward
- 2.5 Multiplying Fractions
- 2.6 Dividing Fractions
- 2.7 Multiplying Rational Numbers
- 2.8 Dividing Rational Numbers
- 2.9 Adding and Subtracting Rational Numbers
- 2.10 Problem Solving: Make Assumptions

Review

Chapter Check

Problem Solving: Using the Strategies

Answers CHAPTER 2 Operations With Rational Numbers





Skill Builder



NO CALCULATOR

Solve the riddle.

1. Add.

$$\begin{array}{r} \text{a) } \$1.05 \\ + 0.65 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b) } \$2.49 \\ + 0.49 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c) } \$8.25 \\ + 1.25 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d) } \$6.98 \\ + 0.15 \\ \hline \end{array}$$

$$\begin{array}{r} \text{e) } \$8.00 \\ + 2.50 \\ \hline \end{array}$$

$$\begin{array}{r} \text{f) } \$1.98 \\ + 0.05 \\ \hline \end{array}$$

$$\begin{array}{r} \text{g) } \$5.09 \\ + 1.09 \\ \hline \end{array}$$

$$\begin{array}{r} \text{h) } \$3.80 \\ + 2.20 \\ \hline \end{array}$$

$$\begin{array}{r} \text{i) } \$5.03 \\ + 0.05 \\ \hline \end{array}$$

- Find each answer above in the rectangle below. *Cross out* the letter in the box.
- Form a word from the *letters that remain* to answer the riddle.

What can "4 × 4" be?

A \$4.20	E \$1.70	T \$1.75	I \$6.18	R \$5.18
M \$10.50	U \$7.23	Y \$6.00	C \$3.98	F \$2.98
K \$11.50	D \$2.03	P \$9.50	O \$7.13	B \$5.08

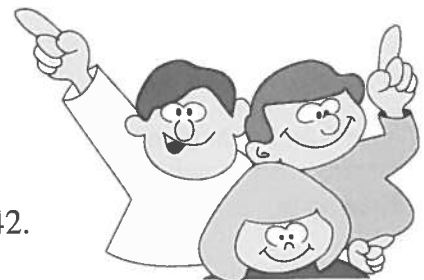


A

GETTING STARTED



Work together with your classmates, using your *MATHPOWER™* student text, page 42.



Warm Up

1. Circle the numbers that 3 will divide into evenly.

62 87 455 612 315 433



2. a) Write the definition of **prime number**.

See page 398 of your MATHPOWER™ student text.

b) List 3 **prime numbers**. _____, _____ and _____.

What is the largest number that will divide into each group?

3. Find the **greatest common factor** (GCF).

a) 6, 8

b) 8, 3

c) 5, 15

d) 6, 3

GCF = 2

$$6 \div 2 = 3$$

$$8 \div 2 = 4$$

e) 6, 15

f) 7, 14

g) 15, 25

h) 6, 5, 2

4. List 5 **multiples** of each number.

Multiples of 3: 3, 6, 9, 12, 15, 18, ...

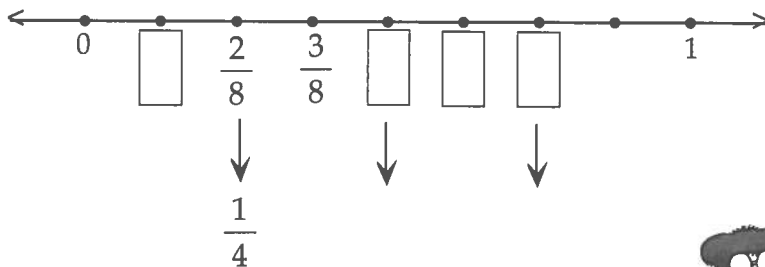
a) 5 _____

b) 4 _____

c) 2 _____

d) 10 _____

5. Complete the number line.



Are all fractions on the number line in **lowest terms**?

$$\frac{2}{8} = \frac{1}{4}$$



6. Write 8 as a fraction. _____

<p>Example: $4 = \frac{4}{1}$</p> <p>$= \frac{8}{2}$</p>
--

7. Circle the mixed numbers.

$2\frac{1}{2}$

$\frac{11}{5}$

$1\frac{4}{5}$

$3\frac{1}{4}$

$\frac{5}{6}$

$6\frac{2}{3}$

8. a) What is an improper fraction?

See page 396 of your MATHPOWER™ student text.

b) Give an example. _____

Mental Math



1. Divide.

$2 \text{ R } \square$
 a) $5 \overline{)12}$

b) $3 \overline{)8}$

c) $4 \overline{)15}$

d) $5 \overline{)16}$

e) $5 \overline{)27}$

f) $6 \overline{)32}$

g) $2 \overline{)19}$

h) $7 \overline{)23}$

2. Evaluate.

a) $2 \times 3 + 1 = \underline{\hspace{2cm}}$

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

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

Multiply first.

d) $2 \times 6 + 5 = \underline{\hspace{2cm}}$

e) $3 \times 5 + 2 = \underline{\hspace{2cm}}$

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

3. Evaluate.

a) $12 \div 3 - 1 = \underline{\hspace{2cm}}$

b) $15 \div 5 - 2 = \underline{\hspace{2cm}}$

c) $16 \div 4 - 4 = \underline{\hspace{2cm}}$

Divide first.

d) $20 \div 4 - 3 = \underline{\hspace{2cm}}$

e) $14 \div 7 - 1 = \underline{\hspace{2cm}}$

f) $21 \div 3 - 2 = \underline{\hspace{2cm}}$

4. Evaluate.

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

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

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

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

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

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

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

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

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

h) $9^2 = \underline{\hspace{2cm}}$

5. Calculate.

a) $\frac{1}{2}$ of 6 = _____

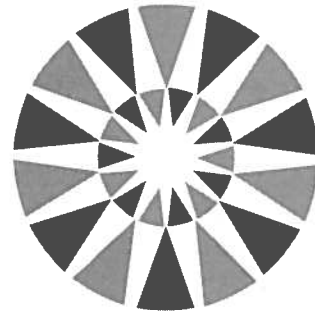
b) $\frac{1}{2}$ of 16 = _____

c) $\frac{1}{2}$ of 20 = _____

Skill Builder

1. Find the pattern. Write the next 3 numbers.

- a) 3, 4, 5, _____, _____, _____.
- b) 3.5, 4.5, 5.5, _____, _____, _____.
- c) 6.1, 6.2, 6.3, _____, _____, _____.
- d) 1.9, 1.8, 1.7, _____, _____, _____.
- e) 1.1, 1.3, 1.5, _____, _____, _____.
- f) 0.3, 0.6, 0.9, _____, _____, _____.



2. Estimate.

Watch the signs!



a)
$$\begin{array}{r} 29 \\ + 42 \\ \hline \end{array}$$

Est.
30
+ 40

b)
$$\begin{array}{r} 68 \\ - 45 \\ \hline \end{array}$$

Est.

c)
$$\begin{array}{r} 66 \\ + 66 \\ \hline \end{array}$$

Est.

d)
$$\begin{array}{r} 74 \\ + 78 \\ \hline \end{array}$$

Est.

e)
$$\begin{array}{r} 99 \\ - 57 \\ \hline \end{array}$$

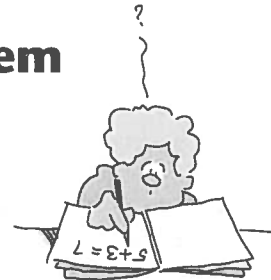
Est.

f)
$$\begin{array}{r} 86 \\ - 21 \\ \hline \end{array}$$

Est.

2.1 Problem Solving: Solve a Simpler Problem Problems and Applications

1. During spring break you have to read a 140-page book. How can you estimate the number of hours it will take you to read the book?



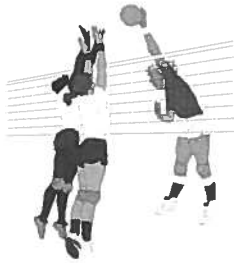
PROBLEM SOLVING





2. Four teams are entered in a volleyball tournament. Every team is to play every other team **once**. How many games in total will be played?

Plan:



Sentence: _____

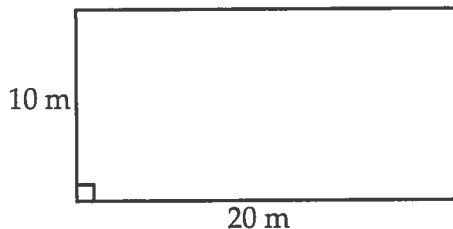
3. There are 6 teams in a hockey league. Every team is to play every other team **once**.
- a) How many games will be played?

Sentence: _____

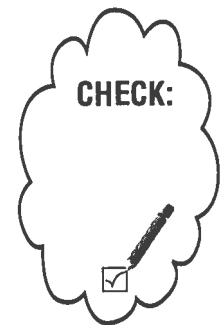
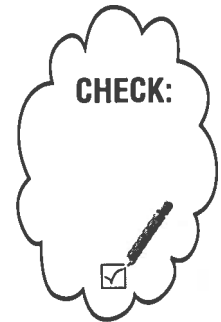
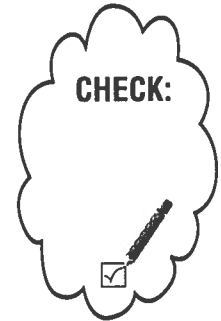
- b) If every team is to play every other team **twice**, how many games will be played?

Sentence: _____

4. A rectangular garden measures 10 m by 20 m. The garden is to be fenced with fence posts placed 2 m apart and with one post in each corner. How many fence posts will be needed?



Sentence: _____



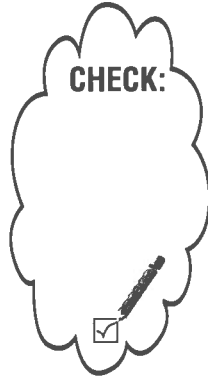
5. a) Describe how you would find the approximate number of breaths you take in 1 h.

“Approximate” means about or close to.

b) About how many breaths do you take in

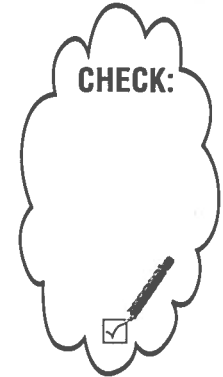
i) 1 h?

Sentence: _____



ii) 1 day?

Sentence: _____



6. Divide.

a) $1 \div 200 =$ _____

b) $1 \div 20\,000 =$ _____

Skill Builder

1. What is the lowest common multiple of each pair (LCM).

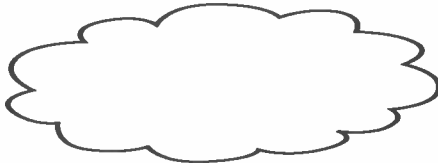
a) 2, 4

2 → 2, ④, 6, 8, ...
 4 → ④, 8, 12, 16, ...
 LCM =

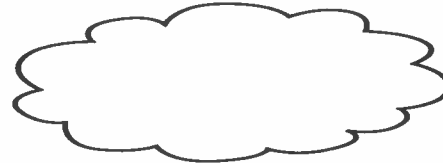
b) 2, 3

LCM =

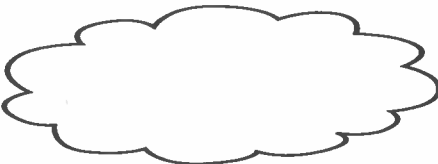
c) 3, 4



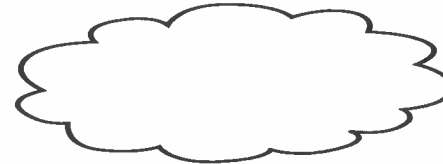
d) 4, 6



e) 2, 5

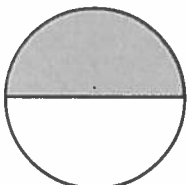


f) 4, 5

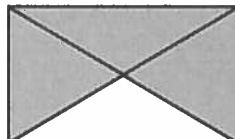


2. What fraction of each figure is shaded?

a)



b)



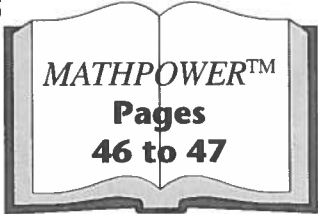
c)



LEARNING TOGETHER Fraction Strips and Fractions



Work together with your classmates, using your **MATHPOWER™** student text, pages 46 and 47.



Skill Builder

1. Find the missing value.

a) $\frac{4}{5} \stackrel{\times 2}{=} \frac{\square}{10}$

b) $\frac{2}{3} \stackrel{\times}{=} \frac{\square}{6}$

c) $\frac{1}{4} = \frac{\square}{12}$

d) $\frac{3}{4} = \frac{\square}{12}$

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

f) $\frac{5}{6} = \frac{\square}{12}$

2. Estimate each product.



a) 42×69

Est.
40
 $\times 70$
□

b) 31×128

Est.
□

c) 28×82

Est.
□

d) 6×56

Est.
□

e) 183×429

Est.
□

f) 39×52

Est.
□

g) 53×88

Est.
□

h) 8×75

Est.
□

3. Change each improper fraction to a mixed number.

a) $\frac{7}{3} = \frac{\square}{3} \frac{\square}{3}$ ← remainder

$\frac{2}{3} \overline{)7}$
6
1 remainder

b) $\frac{10}{9}$

□

c) $\frac{8}{5}$

□

d) $\frac{11}{2}$




□




2.2 Adding Fractions

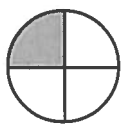

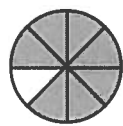
Practice


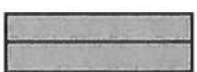



1. Complete the addition sentence that is shown by each set of diagrams.













a)  +  = 
 $\frac{1}{4}$ + _____ = _____

b)  +  = 
 $\frac{1}{4}$ + _____ = _____

c)  +  = 
 _____ + $\frac{5}{8}$ = _____

d)  +   =  
 _____ + $1\frac{1}{2}$ = _____

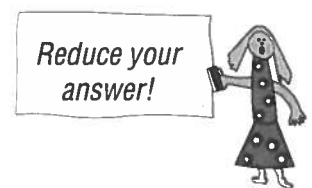
e)    +   =     
 $2\frac{3}{4}$ + _____ = _____

2. Add.

a) $\frac{2}{5} + \frac{1}{5}$
 $= \frac{2+1}{5}$
 $= \frac{\boxed{}}{5}$

b) $\frac{7}{12} + \frac{5}{12}$

c) $\frac{1}{7} + \frac{2}{7}$



d) $\frac{4}{9} + \frac{2}{9}$

e) $\frac{1}{8} + \frac{5}{8}$

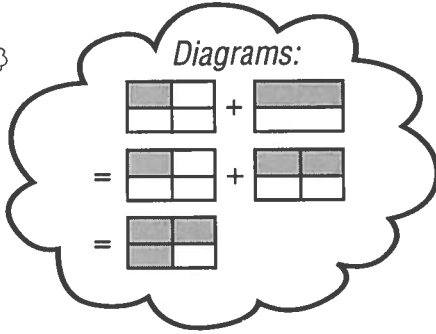
f) $\frac{1}{4} + \frac{3}{4}$

3. Add. Draw diagrams to show your method.

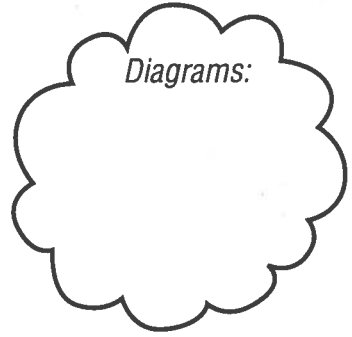
a) $\frac{1}{4} + \frac{1}{2}$ ^{$\times 2$}

$$= \frac{1}{4} + \frac{\square}{4}$$

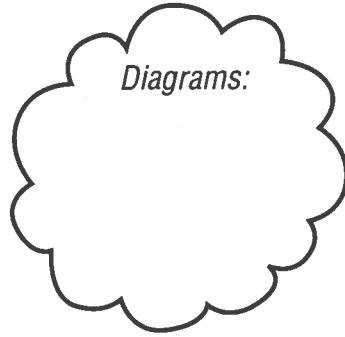
$$= \frac{\square}{4}$$



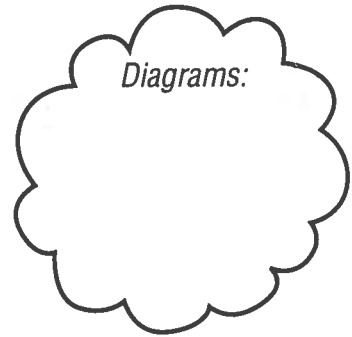
b) $\frac{2}{3} + \frac{1}{6}$



c) $\frac{1}{4} + \frac{2}{3}$



d) $\frac{3}{8} + \frac{3}{4}$



4. Add.

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

b) $\frac{1}{6} + \frac{3}{4}$

c) $\frac{5}{12} + \frac{1}{4}$

Show your steps!

Reduce!

d) $\frac{2}{5} + \frac{1}{2}$

e) $\frac{5}{8} + \frac{3}{4}$

f) $\frac{5}{9} + \frac{1}{3}$

5. Add.

a) $2\frac{1}{4} + \frac{1}{4}$

b) $3\frac{5}{8} + \frac{1}{8}$

c) $4\frac{1}{2} + 1\frac{1}{2}$

$$= 2 + \frac{1}{4} + \frac{1}{4}$$

$$= 2 + \frac{\square}{4}$$

$$= 2\frac{\square}{2}$$

Reduce!

d) $3\frac{3}{5} + 2\frac{1}{5}$

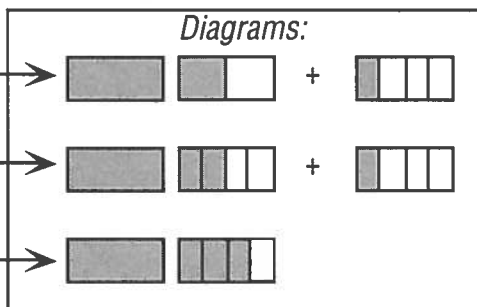
6. i) *Estimate, then add.*

ii) *Draw diagrams to explain your methods.*

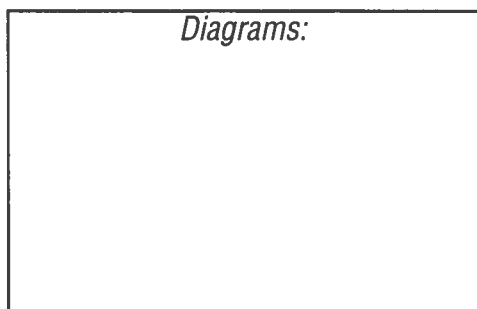
a) $1\frac{1}{2} + \frac{1}{4}$

$= 1 + \frac{\square}{4} + \frac{1}{4}$

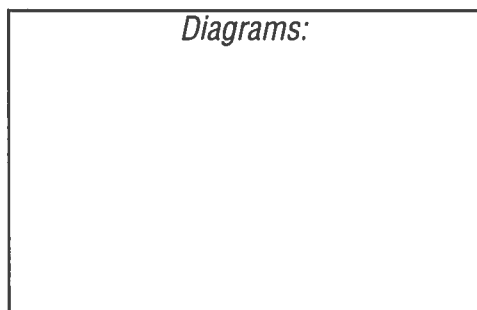
$= 1\frac{\square}{4}$



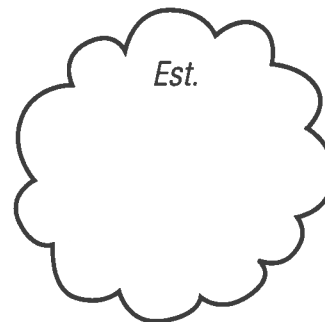
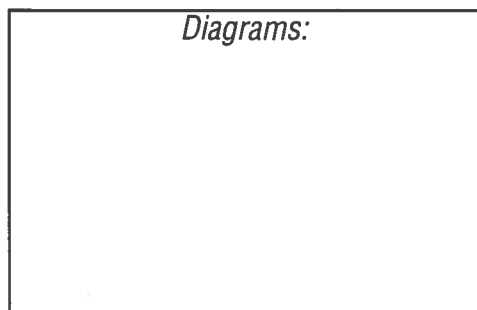
b) $2\frac{3}{8} + 1\frac{1}{4}$



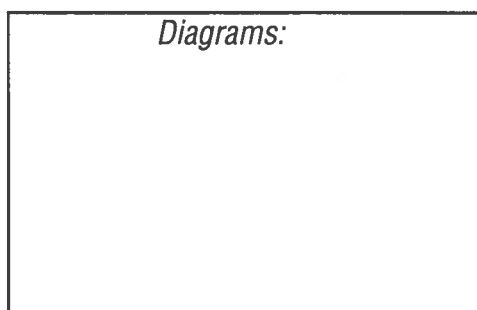
c) $1\frac{1}{2} + 2\frac{1}{3}$



d) $1\frac{5}{8} + 2\frac{1}{2}$



e) $3\frac{2}{3} + 1\frac{1}{6}$



7. Add.

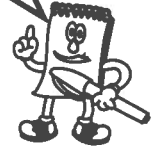
a) $\frac{1}{8} + \frac{3}{8} + \frac{5}{8}$

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

c) $\frac{1}{2} + \frac{1}{4} + \frac{3}{4}$

Reduce answers!

Show your work.



Problems and Applications

8. John ate $\frac{3}{10}$ of the pizza and Michael ate $\frac{1}{5}$. How much of the pizza did the two boys eat?

Hint:
Add the fractions!

CHECK:



Sentence: _____

9. In his first hockey game Kent played about $1\frac{1}{2}$ periods. In his second hockey game he played $1\frac{1}{4}$ periods. About how many periods did he play in all?

CHECK:



Sentence: _____



Skill Builder

1. Tick-tack-toe

a) Add.

b) Draw a line through the 3 answers that are equal.

All answers must be in lowest form.

$\frac{1}{4} + \frac{1}{4} = \square$	$\frac{1}{2} + \frac{1}{4} = \square$	$\frac{2}{3} + \frac{1}{6} = \square$
$\frac{3}{8} + \frac{3}{4} = \square$	$\frac{2}{5} + \frac{2}{5} = \square$	$\frac{7}{12} + \frac{1}{4} = \square$
$\frac{1}{6} + \frac{5}{6} = \square$	$\frac{1}{5} + \frac{3}{5} = \square$	$\frac{1}{2} + \frac{1}{3} = \square$

Rough Work:

$$\frac{1}{2} + \frac{1}{4}$$

$$= \frac{\square}{4} + \frac{1}{4}$$

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

Quotient is the answer in division.

2. Estimate each quotient.

a) $5 \overline{)111}$

Est.

$$5 \overline{)111}$$

b) $2 \overline{)399}$

Est.

c) $4 \overline{)151}$

Est.

d) $3 \overline{)261}$

Est.

e) $6 \overline{)128}$

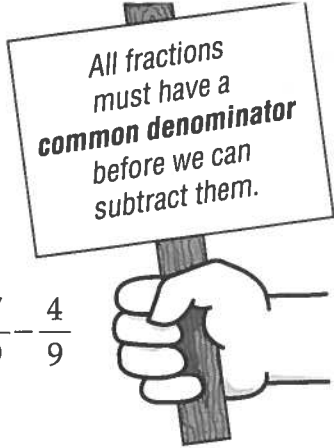
Est.

f) $3 \overline{)305}$

Est.

2.3 Subtracting Fractions

All answers must be in lowest terms.



Practice

1. Find the difference.

$$\begin{aligned} \text{a) } & \frac{5}{12} - \frac{4}{12} \\ &= \frac{5-4}{12} \\ &= \frac{\square}{12} \end{aligned}$$

$$\text{b) } \frac{3}{4} - \frac{1}{4}$$

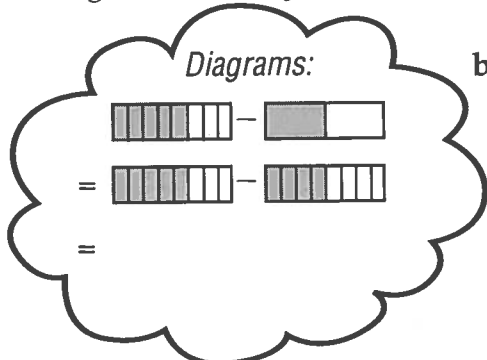
Reduce!

$$\text{c) } \frac{5}{8} - \frac{3}{8}$$

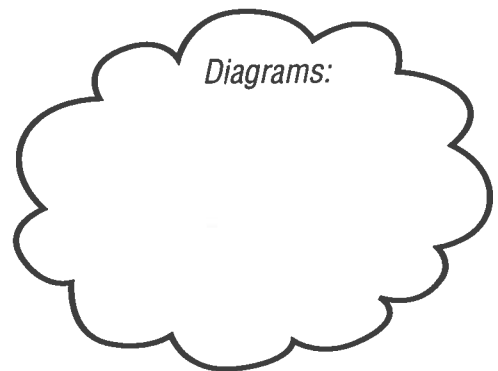
$$\text{d) } \frac{7}{9} - \frac{4}{9}$$

2. Subtract. Draw diagrams to show your method.

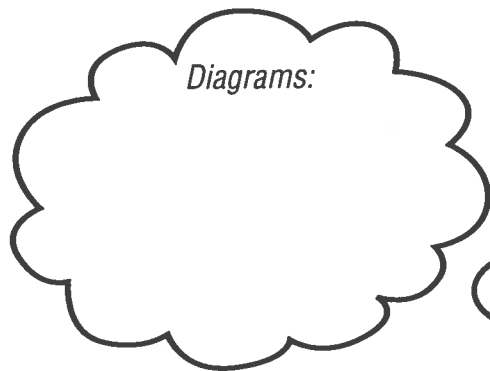
$$\begin{aligned} \text{a) } & \frac{5}{8} - \frac{1}{2} \quad \times 4 \\ &= \frac{5}{8} - \frac{\square}{8} \\ &= \frac{\square}{8} \end{aligned}$$



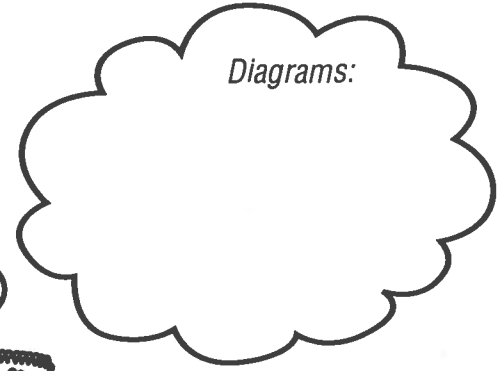
$$\text{b) } \frac{2}{5} - \frac{1}{10}$$



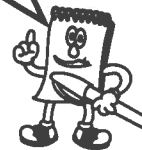
$$\text{c) } \frac{5}{6} - \frac{1}{3}$$



$$\text{d) } \frac{2}{3} - \frac{1}{2}$$



Show your work.



3. Subtract.

$$\text{a) } \frac{1}{2} - \frac{1}{6}$$

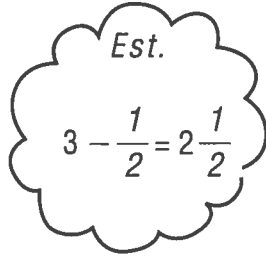
$$\text{b) } \frac{3}{4} - \frac{2}{3}$$

$$\text{c) } \frac{4}{5} - \frac{1}{2}$$

Did you reduce all your answers?

4. Estimate, then subtract.

a) $2\frac{3}{5} - \frac{1}{5}$



b) $4\frac{7}{8} - \frac{5}{8}$



c) $5\frac{3}{4} - 1\frac{3}{4}$



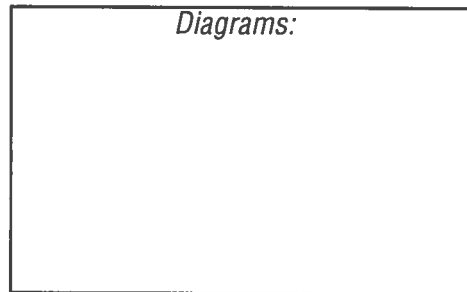
d) $3\frac{5}{6} - \frac{1}{6}$



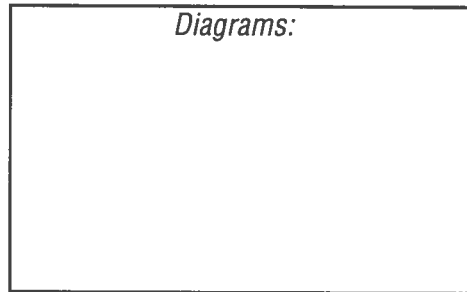
5. i) Estimate, then subtract.

ii) Draw diagrams to explain your method.

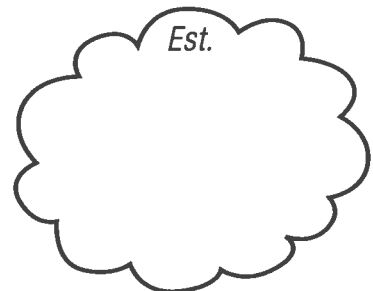
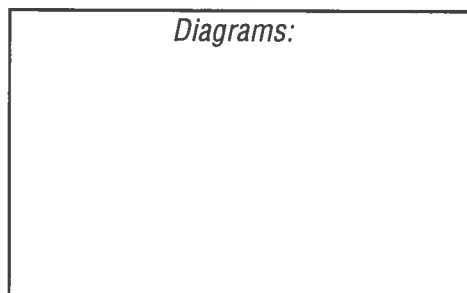
a) $1\frac{3}{4} - \frac{1}{2}$



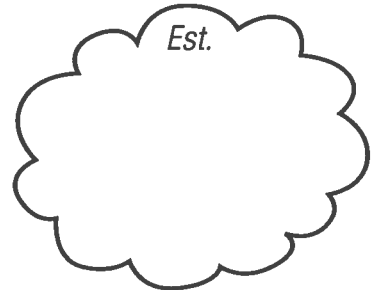
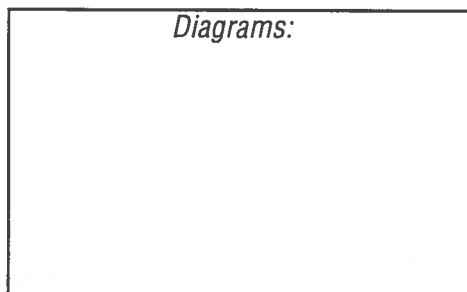
b) $1\frac{3}{8} - \frac{1}{4}$



c) $1\frac{1}{2} - 1\frac{1}{5}$



d) $2\frac{1}{4} - \frac{1}{2}$



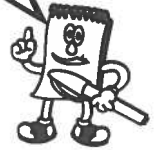
6. Subtract.

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

b) $3\frac{1}{2} - 1\frac{1}{5}$

c) $2\frac{1}{6} - 1\frac{1}{3}$

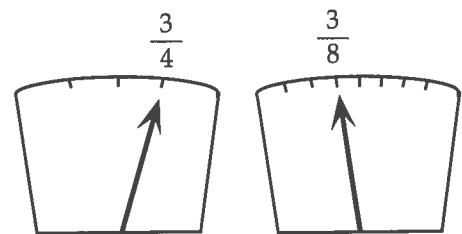
Show your work.



Problems and Applications

7. At the beginning of the day, the gas gauge on Stacey's car showed the tank $\frac{3}{4}$ full. At the end of the day, the gauge showed the tank was $\frac{3}{8}$ full. What fraction of the tank was used that day?

Hint:
Subtract!



CHECK:

Sentence: _____

8. Daniel ran $2\frac{2}{3}$ laps of the track. Carol ran $2\frac{1}{2}$ laps.

a) Who ran farther?

b) How much farther?



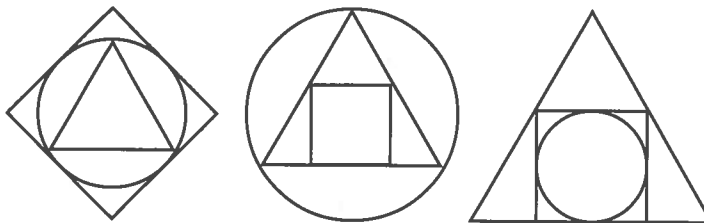
CHECK:

Sentence: _____

Pattern



Look for the pattern. Draw the fourth diagram.



Skill Builder

1. Find the missing numbers.

Work backward!

a) - 4 + 2 = 6

Hint: $6 - 2 + 4 = \underline{\quad}$

b) $\times 5 \div 1 = 20$

$20 \times 1 \div 5 = \underline{\quad}$

c) + 6 - 3 = 12

d) $\times 3 \div 2 + 2 = 8$

e) $\div 3 \times 10 = 20$

Opposite of add is subtract.

Opposite of multiply is divide.

Don't forget to check your answers!

2. Double each amount.

a) \$6 _____

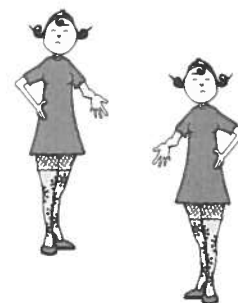
Hint: $\$6 \times 2 = \underline{\quad}$

b) \$10 _____

c) \$3.10 _____

d) \$1.02 _____

e) \$45 _____



Mental Math



Time yourself!



NO CALCULATOR

Add.

1. $8 + 9 = \underline{\quad}$

2. $5 + 4 = \underline{\quad}$

3. $7 + 6 = \underline{\quad}$

4. $8 + 8 = \underline{\quad}$

5. $3 + 9 = \underline{\quad}$

6. $6 + 9 = \underline{\quad}$

7. $7 + 7 = \underline{\quad}$

8. $4 + 8 = \underline{\quad}$

9. $2 + 9 = \underline{\quad}$

10. $4 + 9 = \underline{\quad}$

11. $9 + 9 = \underline{\quad}$

12. $4 + 7 = \underline{\quad}$

Number Correct: _____



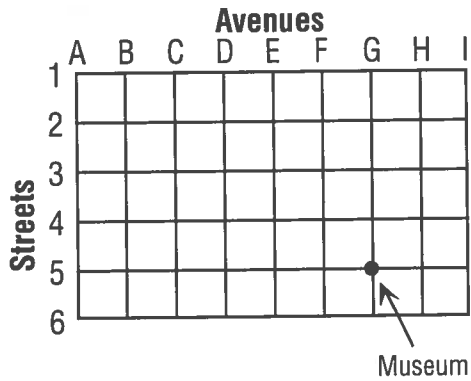
Time: _____ s

2.4 Problem Solving: Work Backward



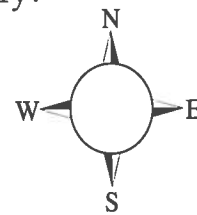
Problems and Applications

1.



A city's streets are numbered and its avenues are lettered as shown.

Angela left the **library** to walk to the museum. She walked 4 blocks south, then 5 blocks east, and finally 1 block north. The **museum** was on the corner of Avenue G and 5th Street. On what corner was the library?



Step 1: Find the museum on the grid.

Step 2: *Work backward!*

- 1 block south
- blocks west
- blocks



Sentence: _____

2. The ferry leaves at 08:30. It takes 30 min on the bus from your home to the dock. You need 10 min to buy your ferry ticket. You need 40 min to shower and dress. You need 20 min to eat your breakfast. For what time should you set your alarm?

Plan: Start at 08:30
 Subtract 20 min for breakfast → _____

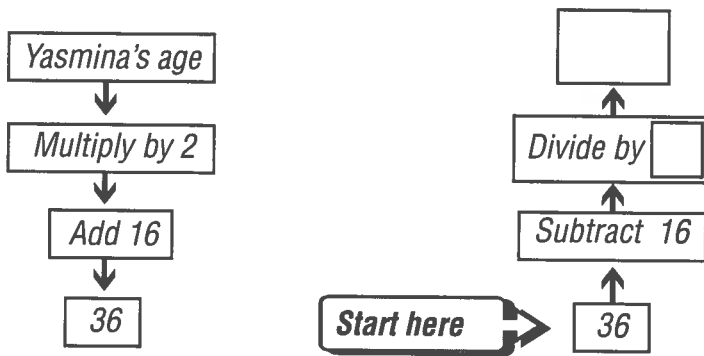
Subtract min to shower and dress → _____

Subtract _____



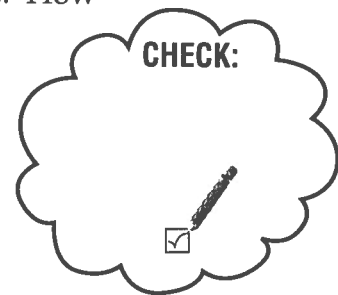
Sentence: _____

3. Yasmina said: "If you multiply my age by 2, then add 16, the result is 36."
How old is Yasmina?



Sentence: _____

4. Sonja had some baseball cards. She gave 7 to her sister and shared the rest equally between herself and a friend. Sonja's share was 13 cards. How many cards did she have at the beginning?



Sentence: _____

5. On Saturday morning, Justin has to be at his swimming lessons for 10:30. It takes 35 min on the bus to get to the pool. Justin needs 10 min to change into his swimming clothes. What time should he catch the bus?



Sentence: _____

Mental Math



Time yourself!



NO CALCULATOR

Subtract.

- | | | |
|----------------------|----------------------|----------------------|
| 1. $18 - 9 =$ _____ | 2. $11 - 7 =$ _____ | 3. $10 - 3 =$ _____ |
| 4. $14 - 7 =$ _____ | 5. $9 - 5 =$ _____ | 6. $13 - 4 =$ _____ |
| 7. $12 - 6 =$ _____ | 8. $8 - 1 =$ _____ | 9. $15 - 7 =$ _____ |
| 10. $17 - 8 =$ _____ | 11. $11 - 2 =$ _____ | 12. $16 - 9 =$ _____ |

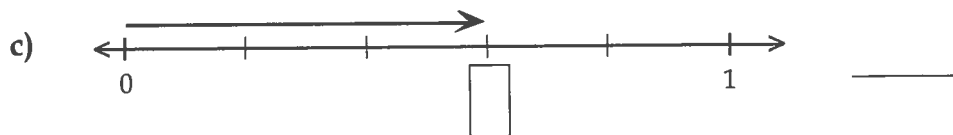
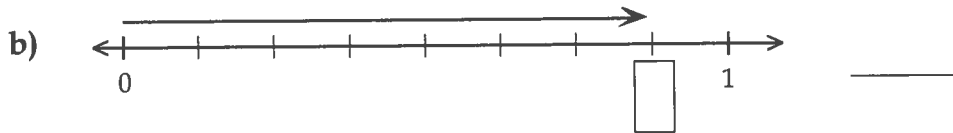
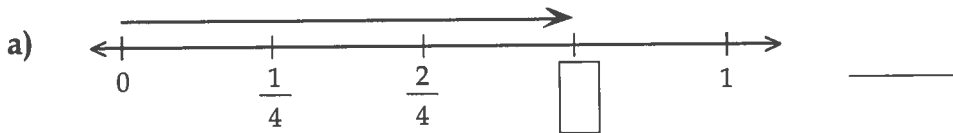
Number Correct: _____



Time: _____ s

Skill Builder

1. What fraction is represented on each number line?



NO CALCULATOR

2. Subtract.

a) $\begin{array}{r} \$1.00 \\ - 0.45 \\ \hline \end{array}$

b) $\begin{array}{r} \$4.00 \\ - 1.25 \\ \hline \end{array}$

c) $\begin{array}{r} \$3.00 \\ - 2.05 \\ \hline \end{array}$

d) $\begin{array}{r} \$6.00 \\ - 5.95 \\ \hline \end{array}$

e) $\begin{array}{r} \$7.00 \\ - 3.50 \\ \hline \end{array}$

f) $\begin{array}{r} \$8.00 \\ - 1.10 \\ \hline \end{array}$

g) $\begin{array}{r} \$2.00 \\ - 0.25 \\ \hline \end{array}$

h) $\begin{array}{r} \$5.00 \\ - 1.50 \\ \hline \end{array}$

LEARNING TOGETHER Multiplying Fractions Using Paper Folding



Work together with your classmates, using your *MATHPOWER™* student text, pages 54 and 55.

MATHPOWER™
Pages
54 to 55

Skill Builder

1. Write each fraction in lowest terms.

a) $\frac{6}{8} = \frac{6 \div 2}{8 \div 2}$

b) $\frac{5}{10}$

c) $\frac{4}{12}$

=

d) $\frac{2}{8}$

e) $\frac{9}{12}$

f) $\frac{12}{10}$

Continues on next page. →

2. Look for the pattern. Find the next 2 numbers.

a) 5, 10, 15, _____, _____.

b) 11, 22, 33, _____, _____.

c) 25, 50, 75, _____, _____.

d) 18, 20, 22, _____, _____.

e) 10, 13, 16, _____, _____.

f) 100, 150, 200, _____, _____.

g) 103, 203, 303, _____, _____.

h) 185, 190, 195, _____, _____.

3. Change each mixed number to a fraction.

a) $1\frac{2}{3} = \frac{\boxed{}}{3}$
 (1 × 3) + 2 = $\boxed{}$
 Numerator

b) $2\frac{1}{6}$

c) $2\frac{3}{4}$

d) $1\frac{1}{9}$

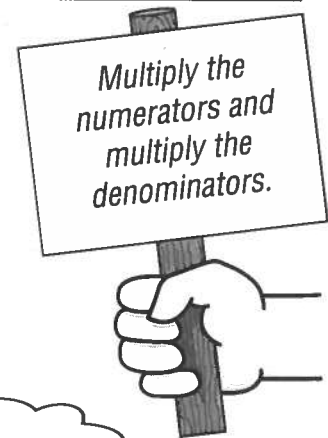
2.5 Multiplying Fractions

Practice

The diagram shows

$$\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$$

Try paper folding.



1. Draw a diagram to find each of the following answers.

a) $\frac{1}{4} \times \frac{1}{2}$

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

c) $\frac{1}{2} \times \frac{3}{5}$

2. Multiply.

a) $\frac{1}{4} \times \frac{1}{3}$

b) $\frac{2}{3} \times \frac{1}{5}$

c) $\frac{1}{2} \times \frac{3}{4}$

d) $\frac{1}{7} \times \frac{1}{2}$

= $\frac{1 \times 1}{4 \times 3}$

= $\boxed{}$

e) $\frac{5}{8} \times \frac{2}{3}$

f) $\frac{3}{5} \times \frac{5}{6}$

g) $\frac{3}{4} \times \frac{5}{6}$

h) $\frac{2}{7} \times \frac{3}{4}$

Write answers in lowest terms!

"of" means to multiply.

3. Calculate.

a) $\frac{1}{2}$ of $\frac{1}{4}$

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

=

b) $\frac{3}{4}$ of $\frac{2}{3}$

c) $\frac{2}{3}$ of 6

Hint:

$6 = \frac{6}{1}$

4. Estimate then multiply.

Change mixed numbers to improper fractions.

a) $3 \times 1\frac{1}{2}$

= $\frac{3}{1} \times \frac{3}{2}$

=

or $4\frac{1}{2}$

Est.

$3 \times 2 =$

b) $2\frac{1}{4} \times 4$

Est.

c) $3 \times 2\frac{1}{6}$

Est.

d) $1\frac{2}{3} \times 4$

Est.

e) $\frac{1}{4} \times 2\frac{1}{3}$

Est.

f) $\frac{3}{8} \times 1\frac{1}{2}$

Est.

g) $\frac{1}{2} \times 3\frac{3}{4}$

Est.

h) $1\frac{3}{4} \times 1\frac{1}{3}$

Est.

i) $2\frac{1}{2} \times 1\frac{1}{5}$

Est.

5. Multiply.

a) $\frac{2}{3} \times \frac{1}{2} \times \frac{4}{5}$

$= \frac{2 \times 1 \times 4}{3 \times 2 \times 5}$

Reduce
your
answer!

=

b) $\frac{1}{4} \times 2 \times \frac{5}{6}$

Hint:

$2 = \frac{2}{1}$

c) $\frac{1}{2} \times 1\frac{1}{3} \times \frac{3}{4}$

6. Complete the table.

The reciprocal of $\frac{3}{4}$ is $\frac{4}{3}$.

Fraction	Reciprocal
a) $\frac{1}{4}$	
b) 3	
c) $\frac{3}{5}$	
d) $\frac{5}{4}$	

Fraction	Reciprocal
e) $\frac{2}{9}$	
f) $3\frac{1}{2}$	
g) $2\frac{1}{3}$	
h) $1\frac{7}{8}$	

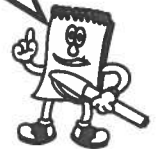
Hint:

$3\frac{1}{2} = \frac{\quad}{2}$

Reciprocal

is $\frac{2}{\quad}$.

Show your
work.



Problems and Applications

7. Insects make up about $\frac{5}{6}$ of known animal species. About $\frac{1}{4}$ of insect species are a type of beetle. What fraction of all animal species are a type of beetle?

Multiply!

Sentence: _____

8. There are 32 students in Amanda's grade 8 class. $\frac{1}{4}$ of the students are going on the band trip.

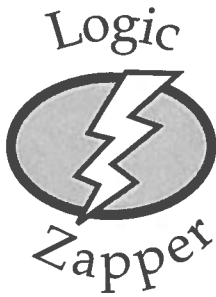
a) How many students are going on the band trip?

Sentence: _____

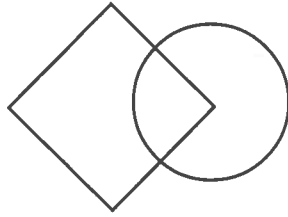
b) How many students will **not** be going on the band trip?

Sentence: _____





The circle and square cross at 2 points.



Draw a diagram to show a circle and a square crossing at 3 points.

Skill Builder

1. To complete the sentence below:

First: Calculate each problem.

Second: Find each answer in the code below. Place the letter of the problem in the space above the answer.

Write all answers in lowest terms!

Y: $\frac{1}{2} \times \frac{1}{4}$
 $= \frac{1 \times 1}{2 \times 4}$

L: $\frac{3}{5} \times \frac{2}{3}$

T: $\frac{1}{6} \times \frac{1}{3}$

P: $\frac{3}{4} \times \frac{1}{9}$

=

G: $\frac{3}{8} \times \frac{1}{6}$

A: $\frac{1}{3}$ of 9
 $= \frac{1}{3} \times \frac{9}{1}$

R: $\frac{2}{5}$ of 10

I: $\frac{3}{4}$ of $\frac{8}{9}$

=

A hamburger likes any



$\frac{1}{16}$ $\frac{2}{3}$ 4 $\frac{2}{5}$ named $\frac{1}{12}$ 3 $\frac{1}{18}$ $\frac{1}{18}$ $\frac{1}{8}$

2. Round each number to the stated place value in brackets.

a) 528 (nearest ten) _____ b) 7610 (nearest thousand) _____

c) 4.111 (nearest tenth) _____ d) 5.98 (nearest one) _____

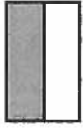

e) 1250 (nearest hundred) _____ f) 699 (nearest ten) _____

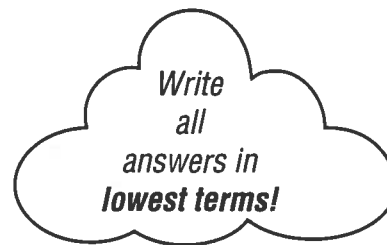
2.6 Dividing Fractions

Practice

The diagram shows

$$\frac{1}{4} \div 4 = \frac{1}{8}$$

If  $\frac{1}{2}$, then  $\frac{1}{2} \div 4 = \frac{1}{8}$.

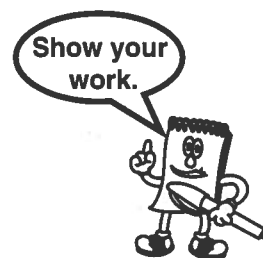


1. Draw a diagram to find each of the following answers.

a) $\frac{1}{4} \div 4$

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

c) $\frac{2}{3} \div 4$



2. Divide.

a) $\frac{3}{8} \div \frac{1}{4}$

$$= \frac{3}{8} \times \frac{4}{1}$$

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

$$= \square \text{ or } 1 \frac{\square}{2}$$

b) $\frac{3}{8} \div \frac{1}{2}$

c) $\frac{2}{3} \div \frac{3}{5}$

d) $3 \div \frac{1}{2}$

$$= \frac{3}{1} \times \frac{2}{1}$$

$$= \frac{\square}{1}$$

$$= \square$$

e) $6 \div \frac{2}{3}$

f) $\frac{1}{3} \div 2$



g) $\frac{3}{4} \div \frac{3}{5}$

h) $\frac{5}{9} \div \frac{1}{10}$

i) $\frac{6}{7} \div 3$

3. Find the quotient.

Change mixed numbers to improper fractions.

a) $2\frac{1}{2} \div \frac{1}{2}$
 $= \frac{5}{2} \times \frac{\square}{\square}$
 $=$

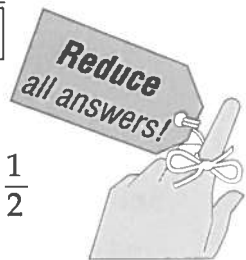
b) $2\frac{3}{4} \div \frac{1}{4}$

c) $\frac{3}{4} \div 1\frac{2}{3}$
 $= \frac{3}{4} \div \frac{\square}{3}$
 $= \frac{3}{4} \times \frac{\square}{\square}$
 $=$

d) $\frac{5}{9} \div 1\frac{2}{3}$

e) $2\frac{1}{4} \div 1\frac{1}{2}$
 $= \frac{9}{4} \div \frac{3}{2}$
 $= \frac{9}{4} \times \frac{\square}{\square}$
 $=$

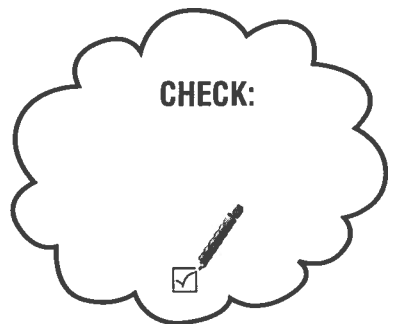
f) $2\frac{3}{4} \div 1\frac{1}{2}$



Problems and Applications

4. You have 6 pizzas. How many people can you serve if each person can eat $\frac{3}{4}$ of a pizza?

Divide!



Sentence: _____



5. Nine tenths ($\frac{9}{10}$) of a grade 8 class are in the gym. These students will be **divided** into 3 equal groups. What fraction of the class will be in each group?



Sentence: _____

6. Michael has a piece of paper tape $1\frac{3}{5}$ m long. He cuts it into pieces. If each piece is $\frac{2}{5}$ of a metre long, how many pieces will he have?



Sentence: _____

7. Find the quotient.

a) $\frac{2}{3} \div \frac{1}{3}$

b) $\frac{4}{5} \div \frac{2}{5}$

c) $\frac{6}{8} \div \frac{3}{8}$

d) $\frac{2}{10} \div \frac{8}{10}$

e) $\frac{3}{10} \div \frac{2}{10}$

f) $\frac{5}{9} \div \frac{4}{9}$

g) $\frac{2}{5} \div \frac{4}{5}$

h) $\frac{4}{7} \div \frac{1}{7}$

i) $\frac{3}{4} \div \frac{1}{2}$

j) $\frac{5}{6} \div \frac{2}{3}$

k) $\frac{1}{2} \div \frac{1}{5}$

l) $2 \div \frac{1}{4}$

8. Divide.

a) $3 \div \frac{1}{9}$

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

c) $1\frac{1}{6} \div \frac{1}{2}$

d) $2\frac{1}{2} \div 1\frac{1}{3}$

Mental Math



Time yourself!



NO CALCULATOR

1. Multiply.

a) $2 \times 2 =$ _____

b) $20 \times 2 =$ _____

c) $200 \times 2 =$ _____

d) $3 \times 4 =$ _____

e) $30 \times 4 =$ _____

f) $300 \times 4 =$ _____

g) $9 \times 3 =$ _____

h) $90 \times 3 =$ _____

i) $900 \times 3 =$ _____

j) $100 \times 10 =$ _____

2. Divide.

a) $20 \div 5 =$ _____

b) $200 \div 5 =$ _____

c) $2000 \div 5 =$ _____

d) $30 \div 6 =$ _____

e) $300 \div 6 =$ _____

f) $3000 \div 6 =$ _____

g) $16 \div 4 =$ _____

h) $160 \div 4 =$ _____

i) $1600 \div 4 =$ _____

j) $270 \div 3 =$ _____

Number Correct: _____

Time: _____ s

Skill Builder

1. Find the missing terms.

a) $\frac{1}{2} \times \frac{1}{\square} = \frac{1}{10}$

b) $\frac{1}{3} \times \frac{1}{\square} = \frac{1}{15}$

c) $\frac{1}{\square} \times \frac{2}{3} = \frac{2}{9}$

d) $\frac{1}{7} \times \frac{\square}{7} = \frac{3}{49}$

2. Express each fraction in lowest terms.

a) $\frac{6}{8} =$

b) $\frac{5}{10}$

c) $\frac{4}{20}$

d) $\frac{8}{12}$

Reduce!

e) $\frac{80}{100}$

f) $\frac{6}{18}$


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


h) $\frac{88}{100}$


2.7 Multiplying Rational Numbers

Practice

1. Complete the multiplication sentence for each diagram.

a) 
 $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$

b) 
 $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

c) 
 $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$

2. Estimate.

a) $-8.5 \times (-1.25)$

Est. $-9 \times (-1) = \underline{\hspace{2cm}}$

b) $-6.6 \times (3.5)$

Est. $\underline{\hspace{2cm}}$

c) $5\frac{1}{2} \times 2\frac{1}{4}$

Est. $\underline{\hspace{2cm}}$

d) $3.2 \times (-2.8)$

Est. $\underline{\hspace{2cm}}$

REMEMBER:
 $\ominus \times \oplus = \ominus$
 $\oplus \times \oplus = \oplus$
 $\ominus \times \ominus = \oplus$

Round to the nearest whole number!

3. Calculate.



a) $-0.25 \times 0.6 = \underline{\hspace{2cm}}$ b) $0.75 \times (-0.2) = \underline{\hspace{2cm}}$ c) $0.35 \times 0.25 = \underline{\hspace{2cm}}$

Press \boxed{C} 0.25 $\boxed{+/-}$ $\boxed{\times}$ 0.6 $\boxed{=}$

d) $-0.5 \times 0.75 = \underline{\hspace{2cm}}$ e) $-0.7 \times (-0.75) = \underline{\hspace{2cm}}$ f) $-0.75 \times 2.5 = \underline{\hspace{2cm}}$

g) $-1.5 \times (-1.67) = \underline{\hspace{2cm}}$ h) $1 \times (-0.875) = \underline{\hspace{2cm}}$ i) $-3.75 \times 0 = \underline{\hspace{2cm}}$

j) $\frac{2}{7} \times \frac{7}{2}$

k) $\frac{1}{8} \times \frac{1}{2}$

l) $\frac{9}{5} \times \frac{1}{2}$

m) $\frac{4}{4} \times \frac{1}{4}$

n) $0 \times \frac{3}{4}$

o) $\frac{1}{10} \times 100$

p) $1\frac{1}{2} \times 3\frac{1}{4}$

q) $\frac{7}{2} \times 1\frac{1}{4}$

r) $1\frac{1}{8} \times 1\frac{1}{3}$

4. Find the answer when $p = 0.5$, $q = 0.6$, and $r = 20.75$.



a) $p \times q$

$= 0.5 \times 0.6$

Substitute!

$=$ _____

Calculate!

b) $p \times r$

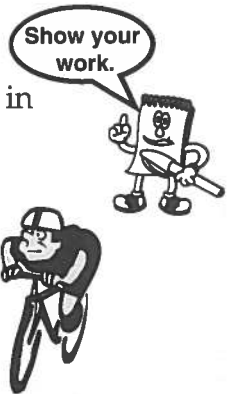
c) $p \times q \times r$

Problems and Applications

5. Martina can ride 11.5 km/h on her mountain bike. How far can she ride in

a) 2 h?

b) 3.5 h?



6. The temperature in Edmonton changed by $-1.2^\circ\text{C}/\text{h}$. What was the temperature change from 01:00 to 06:00?

Hint: How many hours are there between 01:00 and 06:00?

CHECK:



Sentence: _____

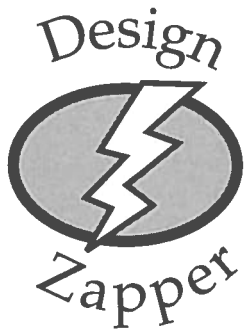
7. How many hours are there in

a) 8.5 days?

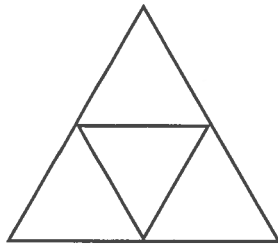
b) 1 week?

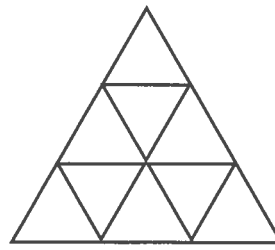
1 day = 24 h

Hint: 1 week = _____ days.



How many triangles can you find in each shape?





Skill Builder

1. Match the following numbers with their reciprocals.

a) $\frac{1}{2}$ _____ -8

b) $\frac{1}{4}$ _____ $\frac{7}{10}$

c) $-\frac{1}{8}$ _____ 4

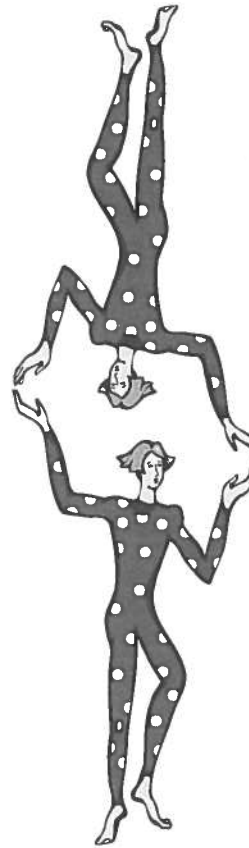
d) $\frac{2}{5}$ _____ $\frac{3}{8}$

e) $\frac{3}{4}$ _____ $\frac{5}{2}$

f) $-\frac{7}{11}$ _____ 2

g) $2\frac{2}{3}$ _____ $-\frac{11}{7}$

h) $1\frac{3}{7}$ _____ $\frac{4}{3}$



"of" means to multiply.

2. Multiply.

a) $\frac{1}{2}$ of $\frac{1}{2}$

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

=

b) $\frac{1}{4}$ of $\frac{1}{2}$


c) $\frac{1}{2}$ of $\frac{2}{5}$


d) $\frac{1}{2}$ of $\frac{4}{5}$

2.8 Dividing Rational Numbers

Practice

1. Complete the division statement for each diagram.

a)  $\frac{1}{2} \div \square = \frac{1}{4}$

b)  $\frac{2}{3} \div \square = \frac{2}{12}$ or $\frac{1}{6}$

2. Estimate your answer.

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

Est. $4 \div 2 = \underline{\hspace{2cm}}$

b) $4\frac{1}{4} \div 1\frac{7}{8}$

Est. $\underline{\hspace{2cm}}$

c) $11.4 \div (-5.5)$

Est. $\underline{\hspace{2cm}}$

d) $-2.7 \div (-1.3)$

Est. $\underline{\hspace{2cm}}$

Hint:
Change rational numbers to whole numbers.

3. State the reciprocals.

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

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

c) $\frac{5}{3}$ $\underline{\hspace{2cm}}$

d) $\frac{7}{2}$ $\underline{\hspace{2cm}}$

e) 3 $\underline{\hspace{2cm}}$

f) $1\frac{3}{4}$ $\underline{\hspace{2cm}}$

g) 0 $\underline{\hspace{2cm}}$

h) $2\frac{1}{5}$ $\underline{\hspace{2cm}}$

Hint: $1\frac{3}{4} = \frac{\square}{4}$

Hint: $2\frac{1}{5} = \frac{\square}{5}$

4. Circle whether each answer is negative or positive.

a) $-0.25 \div 0.5$ negative or positive

b) $6 \div \frac{1}{3}$ negative or positive

c) $\frac{4}{5} \div 5$ negative or positive

d) $0.8 \div (-0.3)$ negative or positive

e) $-4.5 \div (-1.5)$ negative or positive

f) $0.4 \div (-0.15)$ negative or positive

Hint:
 $\oplus \div \oplus = \oplus$
 $\oplus \div \ominus = \ominus$
 $\ominus \div \ominus = \oplus$
 $\ominus \div \oplus = \ominus$



5. Solve.

a) How many $\frac{1}{2}$ s are there in $\frac{3}{4}$?

Hint: $\rightarrow \frac{3}{4} \div \frac{1}{2}$
 $= \frac{3}{4} \times \square$
 $=$

Answers must be in lowest terms.

b) How many $\frac{1}{4}$ s are there in $\frac{5}{8}$?

c) How many $\frac{1}{3}$ s are there in $\frac{2}{3}$?

Hint: $\rightarrow \frac{5}{8} \div$



6. Simplify.



a) $2 \div 0.4 =$ _____

b) $-0.875 \div (-0.25) =$ _____

Press \square C 0.875 \square +/- \square \div 0.25 \square +/- \square =

c) $-10.5 \div 0.25 =$ _____

d) $-50 \div 0.4 =$ _____

e) $-6.75 \div (-3) =$ _____

f) $6.36 \div (-0.16) =$ _____

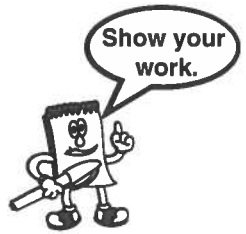
7. Simplify.

Answers must be in lowest terms.

a) $\frac{1}{2} \div \frac{1}{4}$

b) $\frac{4}{5} \div \frac{8}{10}$

c) $\frac{3}{4} \div \frac{3}{8}$



d) $\frac{2}{3} \div \frac{6}{7}$

e) $2\frac{1}{3} \div \frac{1}{2}$

f) $1\frac{1}{2} \div \frac{3}{4}$

8. Cecil had $1\frac{2}{3}$ pizzas. He wanted each of his friends to have $\frac{1}{3}$ of a pizza. How many friends could he share with?

Show your work.



Divide.

CHECK:

Sentence: _____

9. Kerry drove 300 km from Calgary to Edmonton in 3.25 h. What was her average speed in km/h?

Divide.



CHECK:

Sentence: _____

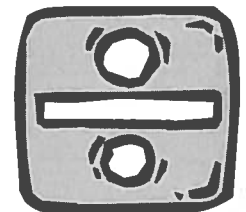
10. A car travels 12.5 km on 1 L of gasoline. How many litres of gasoline does it use when it travels 100 km?

CHECK:

Sentence: _____

11. What is $\frac{1}{3} \div 0$? _____

12. Write a problem that uses **division** to solve it.



Number Zapper

Write the numbers from 1 to 5 in the circles so that each side adds to 15.

Skill Builder

1. Write the lowest common denominator (LCD).

a) $\frac{1}{2}, \frac{1}{3}$ LCD = _____ b) $\frac{2}{3}, \frac{3}{4}$ _____ c) $\frac{1}{2}, \frac{3}{5}$ _____

Hint:

Multiples of 2 → 2, 4, **6**, 8, ...

Multiples of 3 → 3, **6**, 9, ...

d) $\frac{1}{7}, \frac{1}{3}$ _____

e) $\frac{1}{9}, \frac{2}{3}$ _____

f) $\frac{2}{5}, \frac{3}{7}$ _____

g) $\frac{1}{6}, \frac{2}{7}$ _____

h) $\frac{2}{5}, \frac{1}{3}$ _____

i) $\frac{1}{6}, \frac{1}{9}$ _____

2. Write 3 equivalent fractions for each of the following.

Example: $\frac{2}{5} \begin{matrix} \times 2 \\ \times 2 \end{matrix} = \frac{4}{10}$; $\frac{2}{5} \begin{matrix} \times 3 \\ \times 3 \end{matrix} = \frac{6}{15}$; $\frac{2}{5} \begin{matrix} \times 4 \\ \times 4 \end{matrix} = \frac{8}{20}$

Equivalent fractions of $\frac{2}{5}$ are $\frac{4}{10}, \frac{6}{15}, \frac{8}{20}, \dots$

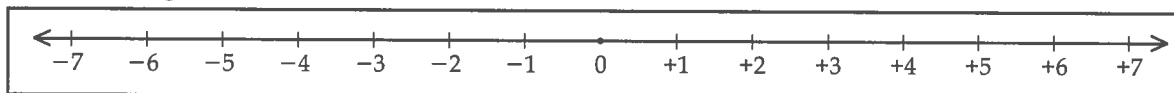
a) $\frac{1}{2} = \underline{\quad} = \underline{\quad} = \underline{\quad}$

b) $\frac{1}{3} = \underline{\quad} = \underline{\quad} = \underline{\quad}$

c) $\frac{4}{5} = \underline{\quad} = \underline{\quad} = \underline{\quad}$

d) $\frac{2}{3} = \underline{\quad} = \underline{\quad} = \underline{\quad}$

3. Add the integers.



a) $(+3) + (+4) = \underline{\quad}$ b) $(+2) + (-1) = \underline{\quad}$ c) $(-4) + (+3) = \underline{\quad}$

d) $(-3) + (-4) = \underline{\quad}$ e) $(-1) + (+4) = \underline{\quad}$ f) $(+5) + (-6) = \underline{\quad}$

4. Subtract the integers.

a) $(+4) - (-2)$

b) $(-6) - (+2)$

c) $(+3) - (+5)$

$= (+4) + (+2)$

$= \underline{\quad}$

Write an addition sentence. Don't forget to change your signs.

2.9 Adding and Subtracting Rational Numbers

Practice

1. Write the lowest common denominator for each pair of fractions.

a) $\frac{1}{2}, \frac{1}{5}$

b) $\frac{3}{8}, \frac{1}{4}$

c) $\frac{2}{3}, \frac{3}{4}$

Hint:

Multiples of 2 → 2, 4, 6, 8, **10**, 12, ...

Multiples of 5 → 5, **10**, 15, ...

LCD = _____

2. Estimate.

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

Est. $1 + 3 = \square$

b) $3\frac{1}{8} - 1\frac{1}{2}$

Est.

c) $6\frac{2}{3} - 4\frac{1}{4}$

Est.

d) $2\frac{1}{4} + 2\frac{3}{4}$

Est.

3. Estimate.

a) $4.125 - 2.75$

Est. $4 - 3 = \square$

b) $4.4 - (-2.5)$

Est. $4 - (-2) = 4 + \square$
 $= \square$

Change subtraction to addition!

c) $7.3 - (-5.1)$

Est.

d) $-0.85 - (-5.1)$

Est.

4. Write true or false for each sentence.

a) $\frac{7}{10} + \frac{11}{10} = \frac{18}{20}$ _____

b) $\frac{7}{3} - \frac{5}{6} = \frac{2}{6}$ _____

Hint: $\frac{14}{6} - \frac{5}{6} = \square$

c) $0.25 - 0.875 = -0.625$ _____

d) $-0.65 - (-1.25) = 0.6$ _____

5. Calculate.

a) $\frac{7}{9} + \frac{1}{3}$

$= \frac{7}{9} + \frac{\square}{9}$

$= \square$ or \square

LCD = 9

b) $\frac{9}{10} - \frac{3}{5}$

LCD = _____

Show your work.



c) $\frac{3}{5} - \frac{1}{4}$

LCD = _____

6. Calculate.

a) $\frac{3}{10} + \frac{53}{100}$

b) $2\frac{1}{3} - \frac{1}{4}$

c) $1 - \frac{1}{100}$



d) $2\frac{8}{9} - 2\frac{2}{3}$

e) $1\frac{3}{16} - \frac{1}{8}$

f) $\frac{3}{5} + \frac{1}{2}$

7. Calculate.



a) $-2.55 + 6.3 =$ _____

Press \boxed{C} 2.55 $\boxed{+/-}$ $\boxed{+}$ 6.3 $\boxed{=}$

b) $8.83 - 9.75 =$ _____

c) $-1.8 + 0.7 =$ _____

d) $-0.25 + 0.21 =$ _____

e) $6.23 - (-3.65) =$ _____

Press \boxed{C} 6.23 $\boxed{-}$ 3.65 $\boxed{+/-}$ $\boxed{=}$

f) $-8.93 + (-5.63) =$ _____

g) $-4.61 - 1.84 =$ _____

h) $2.25 - (-1.5) =$ _____

i) $5.2 - 3.47 =$ _____

j) $-0.85 - 2.25 =$ _____

Problems and Applications

8. During one week in Winnipeg, the nightly low temperatures were -1.5°C , $+2.1^{\circ}\text{C}$, -3.8°C , -2.2°C , $+4.3^{\circ}\text{C}$, -5.3°C , and -6.9°C . What was the average low temperature that week?

Hint: Average = $\frac{\text{total of all temperatures}}{\text{number of temperatures}}$

CHECK:



Sentence: _____

9. Six friends bought 3 pizzas. They ate $2\frac{1}{4}$ pizzas. How much pizza was left over?



Sentence: _____

10. Shares of ABC Foods opened at 9.15 and closed at 7.65. What was the change that day?



Sentence: _____

Pattern

Zapper

1. Given = , then =

2. Given = , then =

Skill Builder

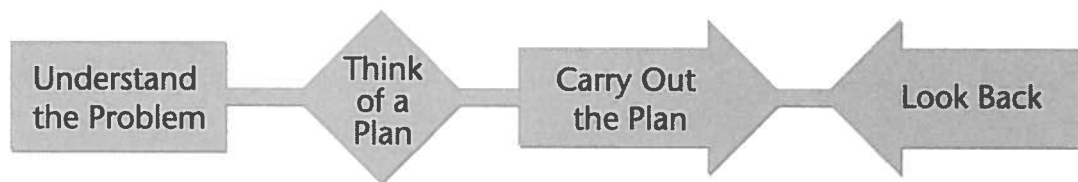
1. Complete each pattern.

a) 4, 8, _____, 16, _____.	b) 3, 9, 15, _____, _____.
c) 2, 4, 8, _____, _____.	d) 5, 15, _____, 35, 45.
e) 1, 3, 9, 27, _____.	f) 2, 4, 6, _____, _____, 12.

2. Find half of each amount.

a) $\frac{1}{2}$ of \$10 = _____	b) $\frac{1}{2}$ of \$18 = _____	c) $\frac{1}{2}$ of \$5 = _____
d) $\frac{1}{2}$ of \$15 = _____	e) $\frac{1}{2}$ of \$2.10 = _____	f) $\frac{1}{2}$ of \$4.50 = _____

2.10 Problem Solving: Make Assumptions



Problems and Applications

1. List some assumptions you make when you
 - a) leave home to go to a movie.

- b) sit down to have supper.

2. Michelle is in grade 8. When she finishes high school she wants to buy a car. The car she would like to buy is \$4000. She calculated that she must save \$75/month. What assumption(s) did she make?

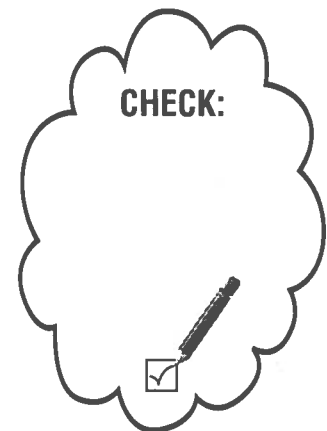
3. Assume that each pattern continues and write the next 3 numbers.

- | | |
|--------------------------------------|---|
| a) 3, 5, 7, 9, _____, _____, _____. | b) 28, 24, 20, 16, _____, _____, _____. |
| c) 1, 3, 9, 27, _____, _____, _____. | d) 50, 45, 40, 35, _____, _____, _____. |
| e) a, d, g, j, _____, _____, _____. | f) 1, 2, 4, 7, 11, _____, _____, _____. |



4. The distance around an island is 20 km. A patrol boat travels around it at 5 km/h.
 - a) How many hours does it take to go around the island?

- b) What assumptions did you make?

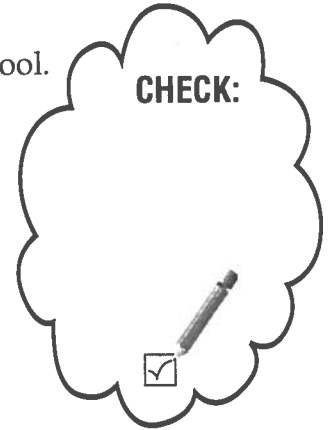


5. Jerry scored 10 points in the first basketball game of the season. There are 20 games during the season. Jerry assumed that he would score 200 points altogether. What assumptions did Jerry make?



6. A grade 8 class is taking a ski trip. The ski hill is 240 km from the school. The bus can travel at 80 km/h.
- a) How long will it take to get to the ski hill?

CHECK:



- b) What assumptions have you made?

Word



Change the word **TOP** to the word **HAT**. You must form a real word each time you change a letter. You can only change one letter at a time.



Change only 1 letter at a time.

Mental Math



Time yourself!



NO CALCULATOR

1. Add.

- a) $8 + 4 =$ _____
- b) $12 + 3 =$ _____
- c) $10 + 8 =$ _____
- d) $7 + 6 =$ _____
- e) $2 + 9 =$ _____
- f) $10 + 10 =$ _____
- g) $5 + 6 =$ _____
- h) $6 + 4 =$ _____
- i) $3 + 11 =$ _____
- j) $9 + 9 =$ _____

2. Subtract.

- a) $15 - 3 =$ _____
- b) $18 - 8 =$ _____
- c) $13 - 6 =$ _____
- d) $11 - 2 =$ _____
- e) $11 - 5 =$ _____
- f) $14 - 3 =$ _____
- g) $18 - 9 =$ _____
- h) $10 - 10 =$ _____
- i) $12 - 4 =$ _____
- j) $10 - 4 =$ _____

Number Correct: _____



Time: _____ s

Review



1. Write 3 fractions equivalent to $\frac{3}{4}$.

2. Find the missing values.

a) $\frac{15}{12} \begin{matrix} \div 3 \\ \div 3 \end{matrix} = \frac{\square}{4}$

b) $\frac{2}{5} \begin{matrix} \times \\ \times \end{matrix} = \frac{8}{\square}$

c) $\frac{9}{36} \begin{matrix} \square \\ \square \end{matrix} = \frac{\square}{4}$

d) $\frac{3}{8} \begin{matrix} \square \\ \square \end{matrix} = \frac{\square}{24}$

3. Estimate, then find the sum.

Fractions must be in lowest terms.

a) $\frac{1}{12} + \frac{5}{12}$ Est. $0 + \frac{1}{2} = \underline{\quad}$
 =
 =

LCD = 8

b) $\frac{3}{8} + \frac{1}{4}$ Est. \quad
 = $\frac{\quad}{8} + \frac{\quad}{8}$
 = $\frac{\square}{\square}$

c) $\frac{3}{4} + \frac{5}{8}$ Est. \quad
 LCD = \quad

d) $\frac{4}{5} + \frac{3}{10}$ Est. \quad
 LCD = \quad

e) $\frac{1}{2} + \frac{1}{6}$ Est. \quad
 LCD = \quad

f) $\frac{2}{3} + \frac{1}{9}$ Est. \quad
 LCD = \quad

g) $1\frac{3}{4} + \frac{3}{4}$ Est. \quad
 LCD = \quad

h) $1\frac{1}{3} + 3\frac{2}{3}$ Est. \quad
 LCD = \quad



i) $2\frac{1}{2} + \frac{5}{6}$ Est.
 LCD = _____

j) $2\frac{1}{3} + \frac{5}{6}$ Est.
 LCD = _____

4. Estimate, then subtract.

a) $\frac{5}{6} - \frac{3}{6}$ Est. $1 - \frac{1}{2} = \underline{\hspace{2cm}}$

b) $\frac{8}{9} - \frac{4}{9}$ Est.



c) $\frac{11}{12} - \frac{3}{4}$ Est.
 LCD = 12
 = _____

d) $\frac{3}{4} - \frac{3}{8}$ Est.
 LCD = _____

e) $1\frac{1}{3} - \frac{2}{3}$ Est.
 LCD = _____

f) $2\frac{2}{5} - 1\frac{3}{10}$ Est.
 LCD = _____

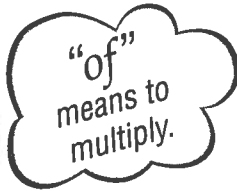
g) $1\frac{3}{8} - 1\frac{1}{4}$ Est.
 LCD = _____

h) $3\frac{4}{5} - 2\frac{3}{4}$ Est.
 LCD = _____

5. Estimate, then multiply.

a) $\frac{2}{3}$ of 15 Est. $1 \times 15 = \underline{\hspace{2cm}}$

b) $\frac{1}{4}$ of $\frac{3}{4}$ Est.



c) $\frac{5}{6} \times \frac{1}{3}$

Est.

d) $\frac{2}{5} \times \frac{1}{4}$

Est.

e) $\frac{2}{3} \times \frac{3}{4}$

Est.

f) $2\frac{1}{2} \times \frac{4}{5}$

Est.

$$= \frac{5}{2} \times \frac{4}{5}$$

$$=$$

Don't forget
to reduce
your answers!

Change
mixed
numbers to a
fraction.

g) $2\frac{2}{3} \times \frac{3}{5}$

Est.

h) $4 \times \frac{5}{6}$

Est.

i) $3 \times 2\frac{1}{6}$

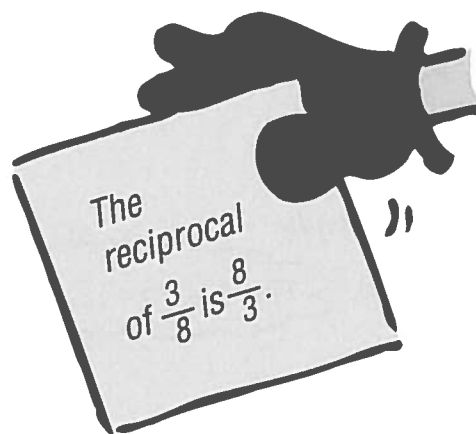
Est.

j) $\frac{1}{3} \times \frac{3}{5} \times \frac{1}{4}$

Est.

6. Complete the table.

Rational Number	Reciprocal
a) $\frac{1}{2}$	
b) $\frac{3}{8}$	
c) $3 = \frac{\square}{1}$	
d) 8	
e) $2\frac{1}{4} = \frac{\square}{4}$	
f) $5\frac{1}{3} = \frac{\square}{3}$	



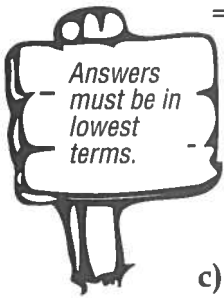
7. Estimate, then divide.

a) $\frac{3}{4} \div \frac{1}{2}$
 $= \frac{3}{4} \times \frac{2}{1}$

Est. $1 \div \frac{1}{2}$
 $= 1 \times 2$
 $= \square$

b) $\frac{2}{9} \div \frac{2}{3}$

Est.

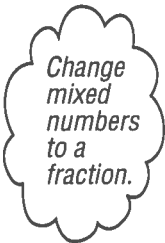


c) $\frac{1}{6} \div \frac{3}{4}$

Est.

d) $\frac{3}{4} \div \frac{7}{8}$

Est.



e) $\frac{5}{6} \div 3\frac{1}{3}$
 $= \frac{5}{6} \div \frac{\square}{3}$
 $= \frac{5}{6} \times \frac{3}{\square}$
 $=$
 $=$

Est.

f) $1\frac{1}{10} \div \frac{1}{5}$

Est.

g) $1\frac{1}{6} \div \frac{1}{3}$

Est.

h) $1\frac{1}{2} \div 2\frac{3}{4}$

Est.

i) $8 \div \frac{2}{5}$

Est.

j) $7 \div 2\frac{1}{3}$

Est.

8. Calculate.



a) $0.5 \times 7 =$ _____ b) $-0.75 \div (-4) =$ _____ c) $18.9 - 12.5 =$ _____

Press \boxed{C} 0.75 $\boxed{+/-}$ $\boxed{\div}$ 4 $\boxed{+/-}$ $\boxed{=}$

Watch your signs!

d) $3.2 + 0.116 =$ _____ e) $0.3 \div 1 =$ _____ f) $0.833 - 0.5 =$ _____

g) $-3.6 + 5.4 =$ _____ h) $-7.3 \times 0.5 =$ _____ i) $9.1 - 3.7 =$ _____

j) $-6 - 0.5 =$ _____ k) $-1.2 \div (-0.3) =$ _____ l) $(-4.1) \times (-2.1) =$ _____

9. Calculate when $m = 0.5$, $n = 0.8$ and $p = -1$.



a) $m \times n$
 $= 0.5 \times 0.8$
 $=$ _____

Substitute

Calculate

b) $n + p$

c) $m \times n \times p$

Substitute

Calculate

d) $m + n + p$

e) $m + n - p$

f) $m \div n \div p$

10. Tien ran for $\frac{1}{2}$ an hour on Monday and $\frac{3}{4}$ of an hour on Thursday.
 For how many hours did she run?

CHECK:

Sentence: _____

11. John ate $\frac{3}{8}$ of the pizza and Peter ate $\frac{1}{4}$ of the pizza. How much more pizza did John eat than Peter?

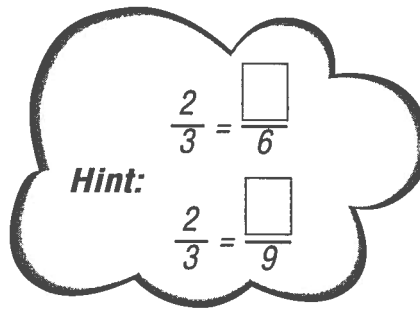
CHECK:

Sentence: _____

Chapter Check

1. Write 2 fractions equivalent to $\frac{2}{3}$.

$$\frac{2}{3} = \boxed{} = \boxed{}$$



2. Add.

a) $\frac{3}{10} + \frac{4}{10}$

b) $\frac{5}{6} + \frac{1}{2}$

c) $1\frac{5}{6} + \frac{1}{3}$ LCD =

LCD = 6
 $= \frac{5}{6} + \frac{\boxed{}}{6}$

=
=

Answers must be in lowest terms.

d) $1\frac{1}{2} + \frac{1}{4}$ LCD =

e) $2 + 1\frac{1}{2}$ LCD =

f) $2\frac{1}{2} + \frac{5}{8}$ LCD =

3. Subtract.

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

b) $\frac{5}{9} - \frac{2}{9}$

c) $\frac{7}{12} - \frac{1}{4}$

LCD = 12
 $= \frac{7}{12} - \frac{\boxed{}}{12}$

=
=

Answers must be in lowest terms.

d) $\frac{2}{3} - \frac{1}{6}$ LCD = _____

e) $2\frac{1}{2} - 1\frac{1}{3}$ LCD = _____

f) $5\frac{3}{4} - 3\frac{1}{2}$ LCD = _____

Answers must be in lowest terms.

4. Multiply.

a) $\frac{3}{5}$ of 10

b) $\frac{2}{9} \times \frac{3}{4}$

c) $\frac{2}{3} \times \frac{1}{4}$

d) $3\frac{2}{3} \times \frac{1}{2}$

= $\frac{\square}{3} \times \frac{1}{2}$

=

=

"of" means to multiply.

5. What is the reciprocal of

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

b) 4? _____

c) $2\frac{1}{5}$? _____

Hint:
 $2\frac{1}{5} = \frac{\square}{5}$

6. Divide.

a) $\frac{8}{5} \div \frac{4}{5}$

b) $\frac{3}{4} \div \frac{1}{2}$

c) $4 \div \frac{2}{5}$

d) $2\frac{1}{3} \div \frac{1}{2}$

= $\frac{\square}{3} \div \frac{\square}{2}$

= ×

=

Reduce all answers!

7. Calculate.

a) $0.5 \times 0.481 =$ _____

c) $1.33 \div 0.7 =$ _____

e) $1.66 \div 0.055 =$ _____

b) $-1.8 \times 2 =$ _____

Press \square C \square 1.8 \square +/- \square × \square 2 =

d) $-1.225 - 3.75 =$ _____

f) $6.1 \times (-0.88) =$ _____

Watch the signs!

g) $255 - 37.505 =$ _____

h) $-1.5 \times (-2.8) =$ _____

i) $5.6 \div (-0.7) =$ _____

j) $-4.1 - 3.5 =$ _____

k) $1.2 \div (-0.9) =$ _____

l) $3.9 + (-2.6) =$ _____

8. Evaluate, when $x = 0.5$, $y = 0.6$ and $z = -3$.

a) $x + y$

b) $z - x$

$= 0.5 + 0.6$

Substitute

$=$ _____

Calculate

c) $x \times y \times z$

d) $xyz \div z$

Substitute

Calculate

9. Pele bought a head of lettuce for \$1.29, a cucumber for \$1.75, and tomatoes for \$1.06.

a) What did he pay in total for the groceries?

Sentence: _____

b) How much change does he get from \$10?

Sentence: _____

10. Jerry used $\frac{2}{3}$ of a tank of gas one day and $\frac{3}{5}$ of a tank the next day.
How much did he use in total?



Sentence: _____

11. The average life span of a lynx is 0.75 of the average life span of a cougar. The average life span of the cougar is 20 years. What is the average life span of a lynx?

Sentence: _____

CHECK:



CHECK:



CHECK:

