

U N I T

3

# Multiplying and Whole Numbers

On the Dairy Farm

## Learning Goals

- find basic multiplication facts to 81 and the related division facts
- use different strategies to estimate products and quotients
- estimate to solve problems
- use different strategies to multiply mentally
- multiply a 2-digit number by a 2-digit number
- divide a 3-digit number by a 1-digit number

# Dividing

## Key Words

factor

product

dividend

divisor

quotient

multiple

compatible numbers

front-end rounding

partial products

- Hay is one part of a dairy cow's diet.  
70 kg of hay feed 2 cows for 1 week.  
About how much hay does 1 cow eat each week?  
Each day?
- The Allards have 90 dairy cows on their farm.  
Each day, they collect twenty-seven litres of milk  
from 1 cow.  
Estimate the amount of milk produced by 9 cows.

# Patterns in Multiplication and Division

1

What are the related facts for  $9 \times 8 = 72$ ?

What are the related facts for  $8 \times 8 = 64$ ?

How do you know how many related facts a multiplication fact has?

**Factors** are numbers you multiply to get a product.  
9 and 8 are *factors* of 72.  
72 is the **product**.



## Explore



Your teacher will give you a large copy of this multiplication chart.

Use patterns to complete the chart.

How many multiplication facts can you write:

- with 9 as a factor?
- with 10 as a factor?

For each of these multiplication facts, write all the related facts.

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6				
2	2	4	6	8	10	12				
3	3	6	9	12	15	18				
4	4	8	12	16	20	24				
5	5	10	15	20	25	30				
6	6	12	18	24	30	36				
7										
8										
9										
10										

## Show and Share

Share your work with another pair of students.

What patterns did you use to complete the chart?

How do you know you found all the related facts?

Look at the factors and products for the 9s facts.

What patterns do you see that would help you remember or find out the multiplication facts for 9?



► Here are some strategies to help you multiply.

- Skip count up from a known fact.

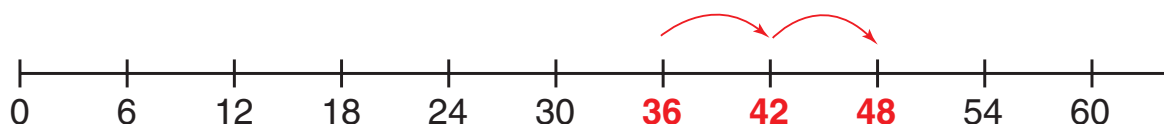
To find  $6 \times 8$ :

Start with:  $6 \times 6 = 36$

Skip count up by 6 to add two more groups of 6.

$$\begin{aligned} \text{So, } 6 \times 8 &= 36 + 6 + 6 \\ &= 48 \end{aligned}$$

$$\text{So, } 6 \times 8 = 48$$



- Skip count down from a known fact.

To find  $6 \times 7$ :

Start with:  $7 \times 7 = 49$

Skip count down by 7 to subtract one group of 7.

$$\begin{aligned} \text{So, } 6 \times 7 &= 49 - 7 \\ &= 42 \end{aligned}$$

$$\text{So, } 6 \times 7 = 42$$

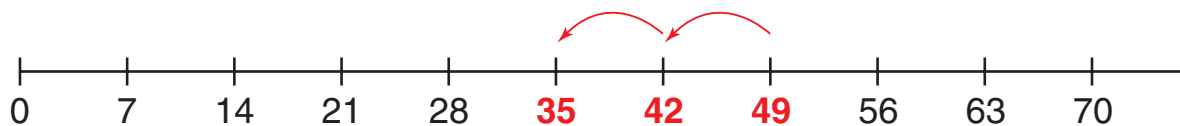
To find  $5 \times 7$ :

Start with:  $7 \times 7 = 49$

Skip count down by 7 to subtract two groups of 7.

$$\begin{aligned} \text{So, } 5 \times 7 &= 49 - 7 - 7 \\ &= 35 \end{aligned}$$

$$\text{So, } 5 \times 7 = 35$$



► Here is a strategy for division.

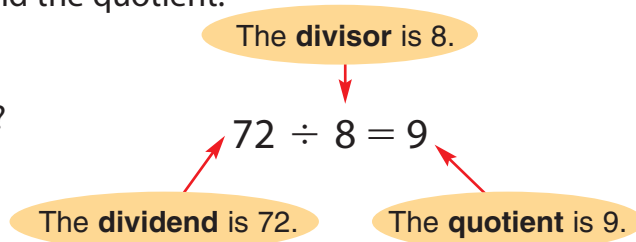
Use related multiplication facts to find the quotient.

To find  $72 \div 8$ :

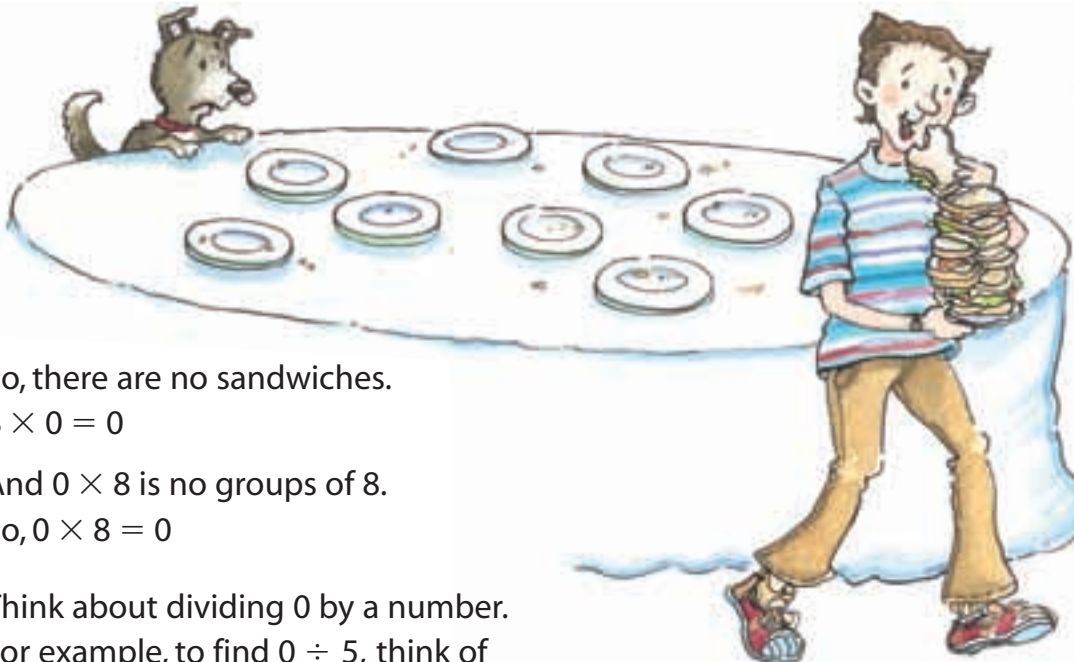
Think: 8 times which number is 72?

You know  $8 \times 9 = 72$ .

$$\text{So, } 72 \div 8 = 9$$



- Think about multiplying by 0.  
For example,  $8 \times 0$  is 8 groups of nothing.  
Here are 8 plates with 0 sandwiches on each plate.



So, there are no sandwiches.

$$8 \times 0 = 0$$

And  $0 \times 8$  is no groups of 8.

$$\text{So, } 0 \times 8 = 0$$

- Think about dividing 0 by a number.  
For example, to find  $0 \div 5$ , think of the related multiplication fact.

Think: 5 times which number is 0?

$$5 \times \square = 0$$

You know  $5 \times 0 = 0$

$$\text{So, } 0 \div 5 = 0$$

- Think about dividing a number by 0.  
For example, to find  $5 \div 0$ , think multiplication.

Think: 0 times which number is 5?

$$0 \times \square = 5$$

There is no number that you can multiply 0 by to get 5.

So, you *cannot* divide a number by 0.

## Practice

### 1. Multiply.

**a)**  $8 \times 7$

**e)**  $6 \times 6$

**b)**  $0 \times 7$

**f)**  $9 \times 9$

**c)**  $9 \times 3$

**g)**  $8 \times 5$

**d)**  $3 \times 0$

**h)**  $4 \times 8$

2. When you multiply a number by 0, why is the product always 0?
3. Find each quotient.  
Write a related multiplication fact for each division statement.  
**a)**  $0 \div 9$       **b)**  $81 \div 9$       **c)**  $45 \div 5$       **d)**  $56 \div 7$
4. Why can you not divide a number by 0?
5. For each set of numbers, write as many related facts as you can.  
**a)** 9, 7, 63      **b)** 8, 7, 56      **c)** 5, 7, 35      **d)** 6, 9, 54
6. Lani knows that  $3 \times 8 = 24$ .  
How can she use that fact to find the product  $5 \times 8$ ?  
Use numbers, words, or pictures to explain.
7. There are 4 utensils at each place setting on the table.  
There are 7 place settings.  
How many utensils are on the table?
8. Jason knows the product of 5 and 9 is 45.  
How can he use that fact to find the product of 4 and 9?
9. There are 6 loot bags for a birthday party.  
There are 42 items to be shared equally among the bags.  
How many items go in each bag?
10. Write a multiplication fact that can help you find each quotient.  
**a)**  $45 \div 9$       **b)**  $42 \div 7$       **c)**  $36 \div 9$       **d)**  $64 \div 8$



11. Éric finds the multiplication facts for 9 by multiplying each number by 10, then subtracting the number.  
How does his strategy work?  
Use words, numbers, or pictures to explain.

### Reflect

Which facts do you find most difficult to remember?  
Which strategies do you use to help you?  
Use examples to explain.

# Other Strategies for Multiplying and Dividing

You can show every multiplication fact as an array.  
Which multiplication facts does this array show?



## Explore



You will need grid paper and scissors.

- Use the grid paper.  
Draw an array for  $8 \times 8$ .  
Cut out the array.  
Record a multiplication fact to describe your array.  
Record a related division fact.
- Cut the array into 2 equal arrays.  
Write a multiplication fact to describe each new array.  
Write the related division facts.
- Cut the arrays again into 2 equal arrays.  
Write the related multiplication and division facts for each new array.



## Show and Share

Share your work with another pair of students.

Are the facts you wrote the same?

If not, who is correct? Or, can both pairs be correct?

What patterns can you find in the facts you recorded?

Doubling and repeated doubling are strategies you can use to multiply.

► Begin with a fact you know.

To find another fact, double one factor, then double the product.

You know  $2 \times 6 = 12$ .

Double the factor 2 to get 4.

Double the product 12 to get 24.

Now you know  $4 \times 6 = 24$ .

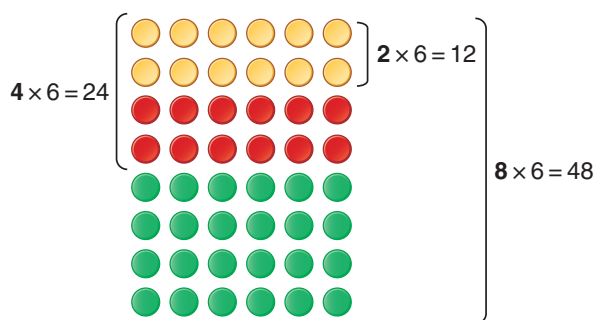
To double a number, add it to itself. Double 12 is  $12 + 12 = 24$ .

Use  $4 \times 6 = 24$ .

Double the factor 4 to get 8.

Double the product 24 to get 48.

Now you know  $8 \times 6 = 48$ .



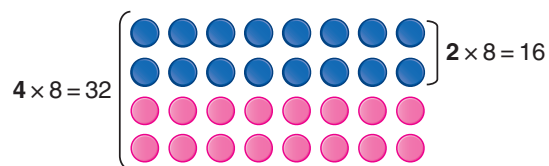
I think of a fact  
I know. When I double one factor,  
the product doubles.



► Here are two ways to use repeated doubling to find  $4 \times 8$ .

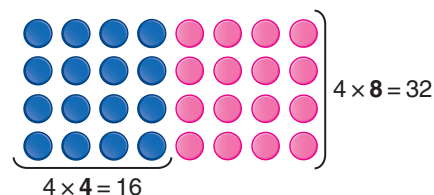
• You know  $2 \times 8 = 16$ .

So,  $4 \times 8 = 16 + 16$   
 $= 32$



• You know  $4 \times 4 = 16$ .

So,  $4 \times 8 = 16 + 16$   
 $= 32$





Halving and repeated halving are strategies you can use to divide.

► To find:  $64 \div 4$

Think: 4 is  $2 \times 2$ ;

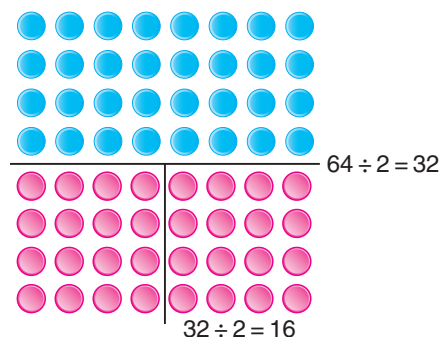
so, to divide by 4,  
I can divide by 2, then divide by 2 again.

$$64 \div 2 = 32$$

Divide by 2 again.

$$32 \div 2 = 16$$

$$\text{So, } 64 \div 4 = 16$$



► To find:  $96 \div 8$

Think: 8 is  $4 \times 2$ , and 4 is  $2 \times 2$ ;

so, to divide by 8, I can divide by 2,  
then divide by 2, then divide by 2 again.

$$96 \div 2 = 48$$

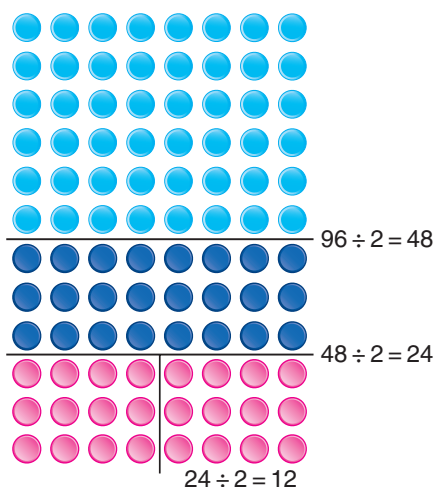
Divide by 2 again.

$$48 \div 2 = 24$$

Divide by 2 again.

$$24 \div 2 = 12$$

$$\text{So, } 96 \div 8 = 12$$



## Practice

1. Multiply.

Then, double one factor and write a new multiplication fact.

Draw an array to show how you got each fact.

**a)**  $4 \times 8$

**b)**  $5 \times 7$

**c)**  $6 \times 4$

**d)**  $4 \times 4$

2. Use doubling to find each product.

Write the multiplication fact you started with each time.

Draw an array to show how you found each product.

**a)**  $8 \times 6$

**b)**  $9 \times 4$

**c)**  $7 \times 6$

**d)**  $8 \times 7$

3. How can you use  $3 \times 6$  to find  $6 \times 6$ ?

Use numbers, words, or pictures to explain.

4. Which multiplication fact could you use to find  $6 \times 12$  by doubling?

5. Use repeated halving to divide.

a)  $36 \div 4$

b)  $48 \div 4$

c)  $60 \div 4$

d)  $72 \div 4$

6. Choose one division fact from question 5.

Draw an array to show repeated halving.

7. Divide.

a)  $48 \div 8$

b)  $24 \div 4$

c)  $78 \div 6$

d)  $52 \div 4$

8. Sixty-four students signed up to attend francophone cultural activities.

a) How many groups of 8 can the students make?

b) One-half of the students go to a “cabane à sucre.”  
How many students do not go?

c) The students are divided equally among 4 teachers.  
How many students are with each teacher?



9. Kayla finds the multiplication facts for 8

by doubling the multiplication facts for 4.

How does Kayla’s strategy work?

Use words, numbers, or pictures to explain.

10. Sophia has trouble recalling  $6 \times 8$ .

Which strategy would you explain to help her?

11. How can you divide by 2 to find  $40 \div 8$ ?

Show all the steps.

12. a) Why can you not use doubling to find these products?

$3 \times 5$

$5 \times 9$

$9 \times 7$

$7 \times 5$

b) Which strategy could you use to find each product?

Find each product and explain the strategy.

### Reflect

Which multiplication and division facts can you find:

- by doubling? By repeated doubling?
- by halving? By repeated halving?

Use words, numbers, or pictures to explain.

# Multiplying with Multiples of 10

Every **multiple** of 10 has 10 as a factor.

These are multiples of 10:

100    1000    30    300    3000

What are some other multiples of 10?

## Explore



You will need a calculator and a place-value chart.

► Find each product.

Record the products in a place-value chart.

$11 \times 1$	$9 \times 9$	$12 \times 8$
$11 \times 10$	$9 \times 90$	$12 \times 80$
$11 \times 100$	$9 \times 900$	$12 \times 800$
$11 \times 1000$	$9 \times 9000$	$12 \times 8000$

Ten Thousands	Thousands	Hundreds	Tens	Ones

► Find each product.

Record the products in a place-value chart.

$20 \times 9$	$70 \times 7$	$50 \times 6$
$20 \times 90$	$70 \times 70$	$50 \times 60$
$20 \times 900$	$70 \times 700$	$50 \times 600$



## Show and Share

Share your work with another pair of students.

Describe any patterns you see.

How can you tell how many digits each product will have?

How can you tell which digits in a product will be 0?

- Use place value to multiply by 10, 100, and 1000.

Find each product. Record each product in a place-value chart.

- $25 \times 10$   
 $25 \times 1 \text{ ten} = 25 \text{ tens}$   
 $25 \times 10 = 250$
- $25 \times 100$   
 $25 \times 1 \text{ hundred} = 25 \text{ hundreds}$   
 $25 \times 100 = 2500$
- $25 \times 1000$   
 $25 \times 1 \text{ thousand} = 25 \text{ thousands}$   
 $25 \times 1000 = 25\ 000$

Product	Ten Thousands	Thousands	Hundreds	Tens	Ones
250			2	5	0
2500		2	5	0	0
25 000	2	5	0	0	0

- Use basic facts and place-value patterns to multiply by multiples of 10, 100, and 1000.

Find each product.

- $3 \times 60$   
 You know  $3 \times 6 = 18$ .  
 $3 \times 6 \text{ tens} = 18 \text{ tens}$                       or    $3 \times 60 = 3 \times 6 \times 10$   
 $3 \times 60 = 180$      $= 18 \times 10$   
      $= 180$
- $3 \times 600$   
 $3 \times 6 \text{ hundreds} = 18 \text{ hundreds}$                       or    $3 \times 600 = 3 \times 6 \times 100$   
 $3 \times 600 = 1800$      $= 18 \times 100$   
      $= 1800$
- $3 \times 6000$   
 $3 \times 6 \text{ thousands} = 18 \text{ thousands}$                       or    $3 \times 6000 = 3 \times 6 \times 1000$   
 $3 \times 6000 = 18\ 000$      $= 18 \times 1000$   
      $= 18\ 000$



- Use what you know about multiplying by multiples of 10, 100, and 1000 to multiply two multiples of 10, 100, and 1000.

Find each product.

•  $20 \times 30$

2 tens  $\times$  30 = 60 tens

**$20 \times 30 = 600$**

or  $20 \times 30 = 2 \times 10 \times 3 \times 10$

$= 2 \times 3 \times 10 \times 10$

$= 6 \times 100$

$= 600$

•  $500 \times 40$

5 hundreds  $\times$  40 = 200 hundreds or  $500 \times 40 = 5 \times 100 \times 4 \times 10$

**$500 \times 40 = 20\,000$**

$= 5 \times 4 \times 100 \times 10$

$= 20 \times 1000$

$= 20\,000$

## Practice

1. Multiply.

**a)**  $7 \times 10$

$7 \times 100$

$7 \times 1000$

**b)**  $3 \times 10$

$3 \times 100$

$3 \times 1000$

**c)**  $6 \times 10$

$6 \times 100$

$6 \times 1000$

**d)**  $9 \times 10$

$9 \times 100$

$9 \times 1000$

2. Multiply.

**a)**  $47 \times 10$

$47 \times 100$

$47 \times 1000$

**b)**  $32 \times 10$

$32 \times 100$

$32 \times 1000$

**c)**  $20 \times 10$

$20 \times 100$

$20 \times 1000$

**d)**  $50 \times 10$

$50 \times 100$

$50 \times 1000$

3. Look at the questions and products in questions 1 and 2.

How can you use mental math to multiply a whole number:

**a)** by 10?

**b)** by 100?

**c)** by 1000?

4. Look at the chart below to answer each question.

How do the digits in a place-value chart move when you multiply a whole number:

**a)** by 10?

**b)** by 100?

**c)** by 1000?

Ten Thousands	Thousands	Hundreds	Tens	Ones
			3	7
		3	7	0
	3	7	0	0
3	7	0	0	0

5. Use a basic fact and place-value patterns to find each product.

**a)**  $7 \times 80$

**b)**  $5 \times 60$

**c)**  $4 \times 90$

$7 \times 800$

$5 \times 600$

$4 \times 900$

$7 \times 8000$

$5 \times 6000$

$4 \times 9000$

6. Look at the questions and products in question 5.

How can you use mental math to multiply a whole number by:

**a)** a multiple of 10? **b)** a multiple of 100? **c)** a multiple of 1000?

7. Multiply.

**a)**  $20 \times 40$

**b)**  $30 \times 10$

**c)**  $40 \times 70$

**d)**  $60 \times 90$

**e)**  $80 \times 50$

**f)**  $70 \times 80$

**g)**  $50 \times 60$

**h)**  $90 \times 30$

8. Look at the questions and products in question 7.

How can you use mental math to multiply two multiples of 10?

9. Michel works in a bank. He receives these deposits.

How much money is in each deposit?

**a)** twelve \$10 bills

**b)** sixty \$20 bills

**c)** thirty \$50 bills

**d)** fifteen \$100 bills

**e)** twenty \$20 bills and ten \$50 bills



10. A ruby-throated hummingbird flaps its wings about 60 times each second.

How many times would it flap its wings in one minute? In one hour?

Show your work.



11. How many seconds are there in 1 hour?

12. A student wrote this product:  $20 \times 500 = 1000$

**a)** What did the student do wrong?

**b)** What is the correct product? How do you know?

13. Write a story problem that can be solved by multiplying by a multiple of 1000.

Solve your problem.

### Reflect

How can patterns in the products help you when you multiply with multiples of 10? Use words and numbers to explain.

# Estimating Products to Solve Problems

Sometimes you don't need an exact answer to solve a problem.



We raised \$500.  
For sure we have  
enough money to buy  
12 sweatshirts for  
the team!

How do the students know they have enough money?

## Explore



A Grade 5 class has a bake sale to raise money for charity.



The students use a cookie recipe that makes about 36 cookies.

The students bake 12 batches of cookies.

Estimate to find about how many cookies they baked.

## Show and Share

Discuss and compare your strategies for estimating with those of another pair of students.

Did you get the same estimates?

If your answer is no, is one estimate wrong? Explain.

Is one estimate closer than the other? Explain.

There are different ways to estimate products.  
Think about the problem and the factors.  
Choose a strategy.

► You can use **compatible numbers**.

Compatible numbers are close to the actual numbers  
and are easy to work with.

Multiples of 10 and of 100 are easy to work with.

- Each bus can seat 48 students.  
About how many students can travel on 8 buses?

To estimate:  $48 \times 8$

Think of the multiples of 10 and 100  
closest to one or both factors.

Think:  $50 \times 8 = 400$

Or,  $48 \times 10 = 480$

Or,  $50 \times 10 = 500$

About 400 students can travel on 8 buses.

Since  $50 > 48$ , and  
 $10 > 8$ , all the estimates are  
greater than the exact answer. When  
you make the factor a greater number,  
the estimate is greater than the  
exact product. It is an  
*overestimate*.

- During the summer vacation,  
Julia delivers 215 flyers each day.  
She delivers flyers for 1 week.  
About how many flyers does Julia deliver?

To estimate:  $215 \times 7$

Think:  $200 \times 7 = 1400$

Julia delivers about 1400 flyers.

Since 200 is less than  
215, I know that 1400  
is an *underestimate*.

► You can use compatible numbers and compensation.

A large jug fills 38 glasses of juice.

There are 52 jugs.

About how many glasses can be filled?

To estimate:  $38 \times 52$

Think:  $40 \times 50 = 2000$

About 2000 glasses of juice can be filled.

We round 38 up to 40,  
so we round 52 down to 50.  
We have *compensated*.





► You can use **front-end rounding**.

Use the front digit of each factor.

- There will be 6 performances of the school play. Fred estimates that about 240 people will come to each performance.

About how many people will come to the play?

To estimate:  $6 \times 240$

Think:  $6 \times 200 = 1200$

About 1200 people will come to the play.



- Fred wants to estimate how many programs to print for the play. If he uses the estimate 1200, he will not have enough programs.

Front-end rounding gives an underestimate.

To improve the estimate, use a compatible number *greater* than 240.

$6 \times 240$  is about  $6 \times 250$ .

Fred knows that  $4 \times 25$  is 100.

So,  $2 \times 25$  is 50.

Then,  $6 \times 25 = 100 + 50$   
 $= 150$

So,  $6 \times 250 = 1500$

Fred should print 1500 programs to make sure he has enough.

I think about money.  
Four quarters make \$1,  
or 100¢.  
So,  $4 \times 25 = 100$   
2 quarters make 50¢.  
So,  $2 \times 25 = 50$



## Practice

1. Which compatible numbers would you use to estimate each product?

a)  $9 \times 65$

b)  $833 \times 7$

c)  $23 \times 69$

d)  $72 \times 12$

2. Estimate each product.

Tell if your estimate is an overestimate, an underestimate, or why you cannot tell.

a)  $28 \times 9$

b)  $74 \times 28$

c)  $467 \times 5$

d)  $8 \times 123$

3. Estimate to predict which products are greater than 2000.

Explain your thinking. Which estimation strategies did you use?

a)  $289 \times 7$

b)  $95 \times 9$

c)  $48 \times 57$

d)  $375 \times 3$

4. Estimate the product of 476 and 8.

Do you think the exact answer will be less than or greater than your estimate?

Explain your thinking.

5. Jack delivers 58 newspapers each day.  
About how many papers does Jack deliver in one week? Show your work.

6. There are 48 chairs in each row.  
There are 64 rows of chairs.  
About how many people can sit down?  
Show your work.



7. Zoé estimated the product  $245 \times 9$ .  
She wrote these statements about the product.
- The product is less than 2500.
  - The product is greater than 1800.
- How do you think Zoé got each estimated product?  
Use words and numbers to explain.

8. The students want to sell about 2000 tickets to a fashion show.  
They hope to sell 425 tickets each day.  
The students sell tickets for 5 days.  
Do you think they will sell enough tickets?  
How do you know?

9. The estimated answer to a multiplication question is 4200.  
What might the question be?

10. Write a story problem for which an overestimate would be needed.  
Solve your problem.  
Show your work.

11. Here are 3 students' estimates of the product  $93 \times 8$ .  
Amal estimated 1000.  
Bernard estimated 720.  
Chloe estimated 950.
- a) Which estimation strategy do you think each student used? Explain.  
b) Without calculating the exact product, how can you tell which estimate is closest to the exact product?

## Reflect

Choose a question from *Practice* where you used compensation in your estimate. Explain why you compensated.

# 5

## Using Mental Math to Multiply

### Explore



How many different ways can you find the product  $14 \times 50$ ?

Record each way.

Use any materials that help.

### Show and Share

Share your work with another pair of students.

Compare the strategies you used to find the product.

### Connect

You know the basic multiplication facts.

Sometimes you can use them to multiply in your head.

The strategy you use can depend on the factors.

Here are some strategies for multiplying mentally.

- You can break the number into smaller parts.

Multiply:  $15 \times 7$

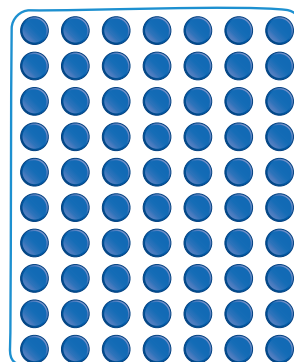
Think of an array for  $15 \times 7$ .

The product  $15 \times 7$  is equal to the sum of the products

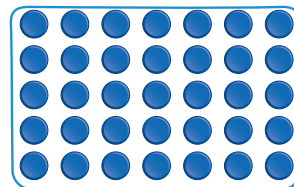
$10 \times 7$  and  $5 \times 7$ .

$$\begin{aligned} 15 \times 7 &= (10 \times 7) + (5 \times 7) \\ &= 70 + 35 \\ &= 105 \end{aligned}$$

So,  $15 \times 7 = 105$



$10 \times 7$

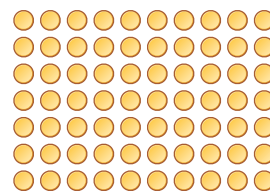
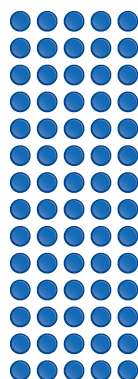
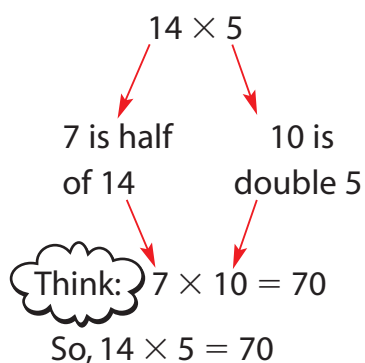


$5 \times 7$

► You can use halving and doubling.

- Multiply:  $14 \times 5$

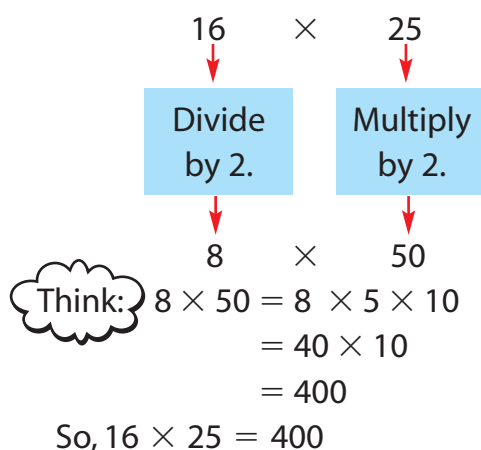
14 rows of 5 are the same as 7 rows of 10



- Multiply:  $16 \times 25$

Use the strategy of halving and doubling.

Look for a factor that doubles to make a multiple of 10.



To halve is to divide by 2.  
To double is to multiply by 2.



► When one factor is close to a multiple of 10 or 100, you can use compatible numbers and then compensate.

Jane has 198 packs of baseball cards.

There are 5 cards in each pack.

How many cards does Jane have?

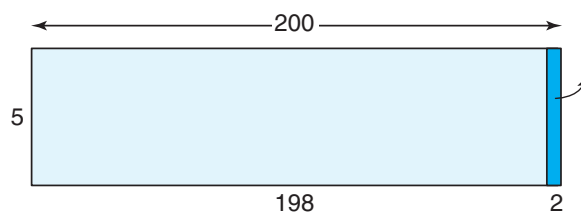
Multiply:  $198 \times 5$

Think:  $198 = 200 - 2$

So,  $198 \times 5 = (200 \times 5) - (2 \times 5)$   
 $= 1000 - 10$   
 $= 990$

Jane has 990 cards.

200 is 2 more packs of 5, so to compensate, subtract  $2 \times 5 = 10$ .



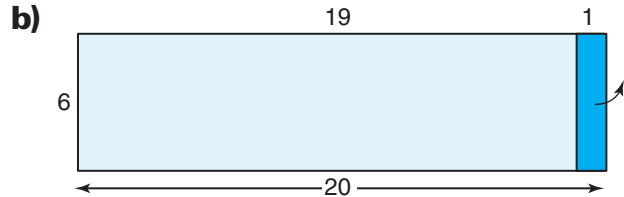
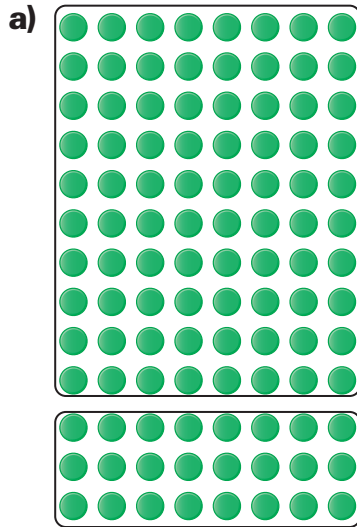


## Practice

Use mental math.

1. Which product does each diagram represent?

Use the diagram to find the product.



2. Multiply. Picture an array each time.

a)  $18 \times 5$

b)  $23 \times 7$

c)  $6 \times 31$

d)  $4 \times 23$

e)  $8 \times 44$

f)  $9 \times 29$

g)  $2 \times 78$

h)  $82 \times 3$

3. Eighteen students went on a fishing trip.

Each student had 6 worms as bait.

How many worms were there altogether?

4. To find  $28 \times 25$ , a student wrote this:

$$28 \times 25 = 7 \times 4 \times 25$$

$$= 7 \times 100$$

$$= 700$$

Explain the student's strategy.

5. Multiply. Explain how you could use halving and doubling.

a)  $12 \times 50$

b)  $12 \times 25$

c)  $24 \times 25$

d)  $24 \times 50$

e)  $46 \times 25$

f)  $23 \times 25$

g)  $46 \times 50$

h)  $23 \times 50$

6. Jamal bought thirty-eight 50¢ stamps.

What was the cost before tax?

7. Multiply. Use mental math. Explain your strategy.

a)  $6 \times 199$

b)  $7 \times 302$

c)  $3 \times 498$

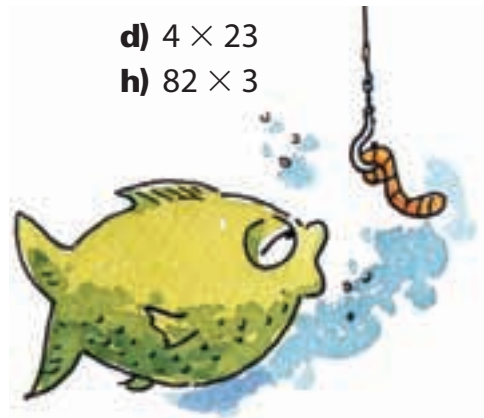
d)  $5 \times 310$

e)  $3 \times 503$

f)  $101 \times 4$

g)  $4 \times 210$

h)  $197 \times 5$



### 8. Who Has the Greater Product?

You will need a set of digit cards from 0 to 9.

The goal is to arrange 4 digits to make a multiplication problem with the greatest product.

Each player copies and completes the multiplication grid.

Take turns drawing one card.

As each card is selected, each player writes that digit in any box on her or his grid.

Continue until all the boxes have been filled.

Multiply.

The player with the greater product scores a point.

The first player to score 5 points wins.



$$\begin{array}{r} \square \square \square \\ \times \quad \square \\ \hline \end{array}$$

9. List the strategies you used to play the game *Who Has the Greater Product?*



10. Use mental math.

Find the product of  $48 \times 50$  two different ways.

Describe the strategies you used.

11. A theatre has 32 rows of seats.  
Each row has 25 seats.  
How many seats are there in the theatre?



12. Copy the multiplication frame at the right.  
Arrange the digits 2, 3, 4, and 5 to make the greatest product.  
Use each digit only once.  
How did you decide how to arrange the digits?

$$\begin{array}{r} \square \square \\ \times \square \square \\ \hline \end{array}$$

13. Write a multiplication problem that can be solved using mental math. Solve the problem.  
Which strategy did you use? Why?

### Reflect

Which of these mental math strategies do you find easiest?  
Tell why.

- breaking the number into parts
- halving and doubling
- compatible numbers and compensation

# Multiplying 2-Digit Numbers

## Explore



How many different ways can you find the product  $14 \times 23$ ? Show your work for each strategy you use.

## Show and Share

Share your strategies with another pair of students. If you used a strategy they did not use, explain your strategy to them.



## Connect

Multiply:  $21 \times 13$

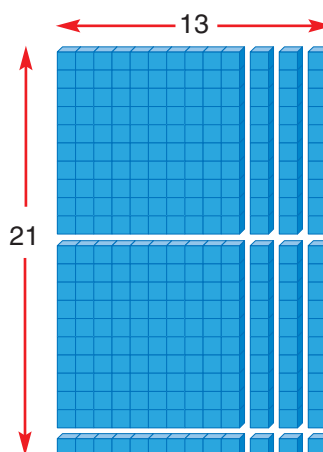
Here are three strategies students used to find the product.

- Rami modelled the problem with Base Ten Blocks. The array is a rectangle. Its area is  $21 \times 13$ .

Rami sees there are:

- 2 hundreds or 200
- 7 tens or 70
- 3 ones or 3

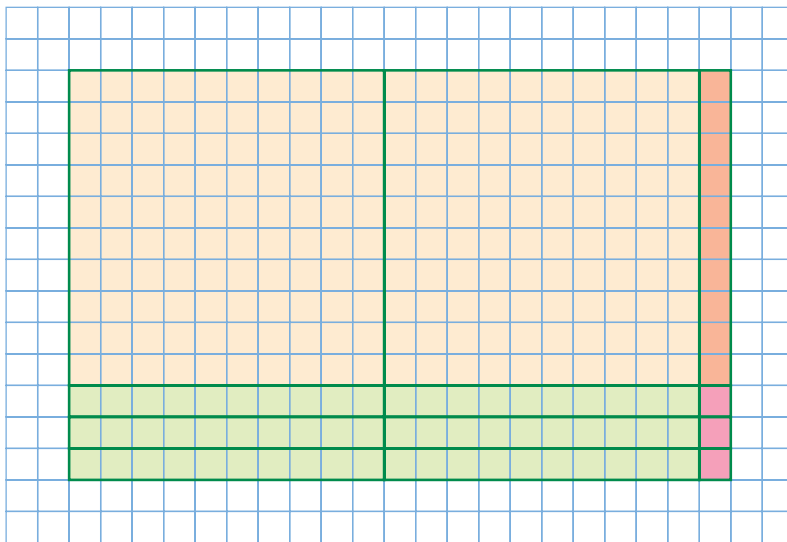
$$200 + 70 + 3 = 273$$



- Keisha used grid paper.  
She drew an array with 13 rows and 21 squares in each row.

$$20 \times 10 = 200$$

$$1 \times 10 = 10$$



Keisha recorded her work like this:

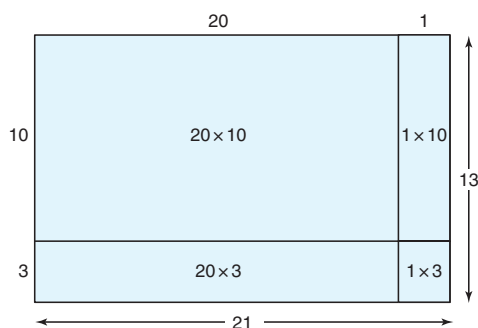
$$\begin{array}{r} 21 \\ \times 13 \\ \hline 200 \\ 10 \\ 60 \\ + 3 \\ \hline 273 \end{array}$$

$$20 \times 3 = 60$$

$$1 \times 3 = 3$$

So,  $21 \times 13 = 273$

- Samuel drew a diagram similar to Keisha's array.



I get *partial products* by multiplying each number in the first expanded form by each number in the second expanded form.

Samuel wrote each factor in expanded form.

Then he wrote 4 **partial products**.

$$\begin{aligned} \text{Samuel wrote: } 21 \times 13 &= (20 + 1) \times (10 + 3) \\ &= (20 \times 10) + (20 \times 3) + (1 \times 10) + (1 \times 3) \\ &= 200 + 60 + 10 + 3 \\ &= 273 \end{aligned}$$

So,  $21 \times 13 = 273$



The students estimated to check that the product is reasonable.

They wrote compatible numbers:

$$\begin{aligned}13 \times 21 \text{ is about } 15 \times 20 &= 15 \times 2 \times 10 \\ &= 30 \times 10 \\ &= 300\end{aligned}$$

Since the estimate, 300, is close to the answer, 273,  
the answer is reasonable.

## Practice

1. Sketch a diagram to find  $28 \times 16$ .

Show how the diagram helps you find the product.

2. Multiply. Use a different method to check.

What do you notice about the products in each pair?

<b>a)</b>	$34$	$26$	<b>b)</b>	$45$	$23$	<b>c)</b>	$19$	$54$
	$\times 26$	$\times 34$		$\times 23$	$\times 45$		$\times 54$	$\times 19$

3. Write each product in expanded form.

Then find the product.

<b>a)</b> $23 \times 32$	<b>b)</b> $39 \times 13$	<b>c)</b> $51 \times 37$	<b>d)</b> $44 \times 54$
--------------------------	--------------------------	--------------------------	--------------------------

4. Multiply.

Which strategy did you use each time?

<b>a)</b> $35 \times 52$	<b>b)</b> $65 \times 30$	<b>c)</b> $48 \times 25$	<b>d)</b> $41 \times 74$
<b>e)</b> $92 \times 43$	<b>f)</b> $14 \times 75$	<b>g)</b> $20 \times 54$	<b>h)</b> $25 \times 16$

5. Find each product.

Which strategy did you use each time?

<b>a)</b> $46 \times 64$	<b>b)</b> $23 \times 50$	<b>c)</b> $61 \times 11$	<b>d)</b> $17 \times 33$
<b>e)</b> $29 \times 41$	<b>f)</b> $68 \times 12$	<b>g)</b> $80 \times 16$	<b>h)</b> $16 \times 77$

6. Can you use mental math to find any of the products in question 5?

Explain how you know.

7. To multiply  $14 \times 32$ , one student wrote this:

$$\begin{array}{r}14 \\ \times 32 \\ \hline 28 \\ + 420 \\ \hline 448\end{array}$$

Explain the student's strategy.



8. Find the product  $25 \times 25$ .

How can you use the product  $25 \times 25$  to help find each product?

- a)  $25 \times 26$       b)  $24 \times 25$       c)  $50 \times 25$       d)  $75 \times 25$

9. Jordan tiled a wall.

His wall has 27 rows each with 27 tiles.

Sharma tiled a different wall.

Her wall has 26 rows of 29 tiles.

- a) Whose wall has more tiles?

- b) How many more tiles does it have?

Show the strategies you used.



10. Which multiplication facts can you use to find  $45 \times 23$ ?

How do you know?

Show your work.

11. Estimate to predict which products are greater than 3000.

Find each product greater than 3000.

- a)  $58 \times 39$       b)  $75 \times 58$       c)  $82 \times 85$       d)  $30 \times 75$

12. Anjotie has 24 kayaks. She rents out a kayak for \$14 per hour.

All the kayaks are rented for 8 hours.

How much money will Anjotie get?

Show the strategy you used.

13. Erica earns \$9 per hour. She works 32 hours per week.

Estimate, then calculate, how much Erica earns in 2 weeks.

14. Suppose you wanted to arrange 4 different digits to make the greatest product.

Which arrangement would you use? Why?

- a)  $\begin{array}{r} \square \square \square \\ \times \square \\ \hline \end{array}$

- b)  $\begin{array}{r} \square \square \\ \times \square \square \\ \hline \end{array}$

## Reflect

Which strategy for multiplying did you find the easiest?

Use words, numbers, or pictures to explain.

## At Home



Measure the length and width of a magazine to the closest centimetre. Find the area of the cover of the magazine.

# Multiplication Tic-Tac-Toe



You will need 20 each of two colours of counters and 2 paper clips.  
Your teacher will give you a copy of the game board and the factor list.

The object of the game is to be the first player to place 3 counters in a row. The row can be horizontal, vertical, or diagonal.

- Each player chooses a different colour.
- Player 1 chooses any two factors in the factor list.  
He marks the factors with paper clips.
- Player 1 multiplies the factors.  
He finds the product on the game board and covers it with a coloured marker.  
If the product appears more than once on the game board, he chooses which one to cover.
- Player 2 may move only one of the paper clips on the factor list.  
She finds the product of the factors.  
She finds the product on the game board and covers it with a marker.
- Players continue to take turns.  
Each player may move only one paper clip per turn.
- The first player to place 3 counters in a row wins.



Share your strategies for playing the game.  
Talk about how you found products that you did not know automatically.

## **Variation:**

Play 4-in-a-Row.

# Estimating Quotients to Solve Problems

## Explore



The LeBlanc family drove 675 km in 8 hours.  
The family drove the same distance each hour.  
Estimate to find about how far the family drove in one hour.

## Show and Share

Share your results with another pair of students.  
Describe the strategies you used to estimate.  
Did you get the same distance?  
If not, is any distance wrong? Explain.



## Connect

Here are some strategies you can use to estimate quotients.

- \$873 are to be shared among 9 people.  
About how much will each person get?

Estimate:  $873 \div 9$

Look for compatible numbers.

873 is close to 900.

$$9 \text{ hundreds} \div 9 = 1 \text{ hundred} \\ = 100$$

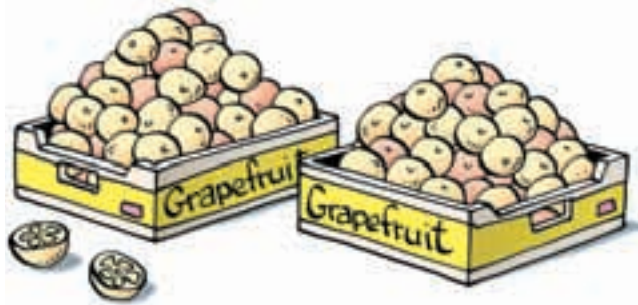
Each person will get about \$100.

This is an overestimate  
because  $900 > 873$ .



I remember that compatible numbers are numbers that are easy to use mentally.

- There are 258 grapefruit.  
Each fruit basket will have 4 grapefruit.  
About how many fruit baskets can be made?



Because I used a number less than 258, I know that my estimate is an underestimate.



Estimate:  $258 \div 4$

Use front-end rounding.

$258 \div 4$  is about  $200 \div 4$ .

Think:  $20 \div 4 = 5$ , so  **$200 \div 4 = 50$**

This estimate is low.

To get a closer estimate,

look at the first 2 digits of the dividend:  **$258 \div 4$**

Think: Which division fact is closest to  $25 \div 4$ ?

You know that  $24 \div 4 = 6$ , so  $25 \div 4$  is close to 6.

So,  $258 \div 4$  is about  $240 \div 4 = 60$

About 60 fruit baskets can be made.

## Practice

- Which compatible numbers would you use to estimate each quotient? Why did you choose those numbers?  
**a)**  $238 \div 3$       **b)**  $193 \div 2$       **c)**  $742 \div 5$       **d)**  $384 \div 4$
- Estimate each quotient. Which strategies did you use?  
**a)**  $325 \div 3$       **b)**  $283 \div 2$       **c)**  $361 \div 4$       **d)**  $199 \div 5$   
**e)**  $486 \div 5$       **f)**  $768 \div 7$       **g)**  $476 \div 8$       **h)**  $927 \div 9$
- Nine hundred seventy-five maple taffy candies are shared equally among 9 students. About how many candies will each student get?
- Nine hundred thirty bottles are placed in cartons of 6. About how many cartons are there?
- Eight hundred twenty-eight pencils are packaged in boxes of 8. About how many boxes are there?



6. In the photographs section of the yearbook, there are 8 student photos per page. About how many pages are needed for 654 photos?

7. Kris has 862 game tokens. He plans to share them among 9 people. About how many tokens will each person get? How did you find out?



8. Martin estimated  $365 \div 4$ . He wrote these statements:
- The quotient has 2 digits.
  - The quotient is greater than 80.
- How might Martin have made his estimate? Use words and numbers to explain.

9. The Grade 5 class organized a walk to raise funds for a charity. Nine students walked a total distance of 130 km.

a) About how far did each student walk?

b) What assumptions did you make?

10. One toonie is about 3 cm wide.

Toonies are placed in a row 448 cm long.

a) About how many toonies are in the row?

b) What is the approximate value of the toonies?

11. Geri is organizing school supplies.

She counted 248 pencils.

Geri decided to put 6 pencils in each packet.

About how many packets did she make?

12. Four elephants eat a total mass of 890 kg of food in one day.

a) About how much food does one elephant eat?

b) What assumptions did you make?

## Reflect

When might you want to estimate to find an approximate quotient? Use an example to explain.

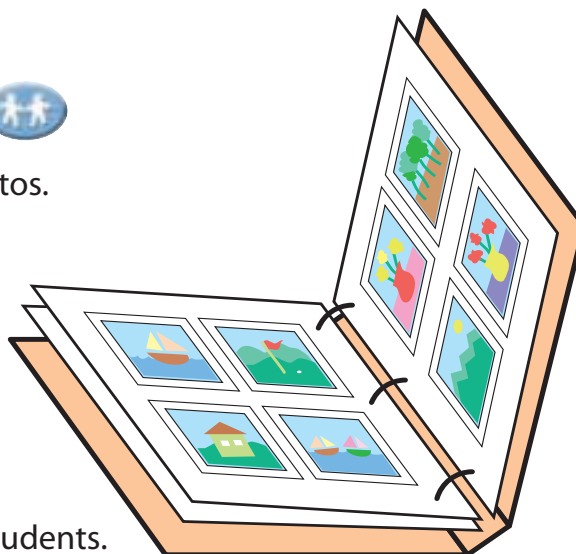


# Dividing a 3-Digit Number by a 1-Digit Number

## Explore



Each sheet of this photo album holds 8 photos.  
Evan has 325 photos.  
How many sheets does he need?  
How many different ways can you find out?  
Show your work for each strategy you use.



## Show and Share

Share your strategies with another pair of students.

## Connect

Three children share \$1.25 equally. How much does each child get?  
Change \$1.25 to 125¢.  
To find out how much each child gets, divide:  $125 \div 3$   
Here are two strategies students used to find the quotient.

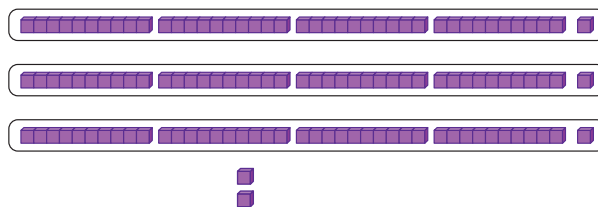
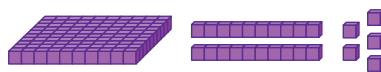
► Emma used Base Ten Blocks.

She traded the hundred flat for 10 rods.

Emma then arranged the 12 rods and 5 unit cubes into 3 equal groups.

There are 2 cubes left over.

So,  $125 \div 3 = 41 \text{ R}2$



Each group has 41.

- Amil uses repeated subtraction to divide.

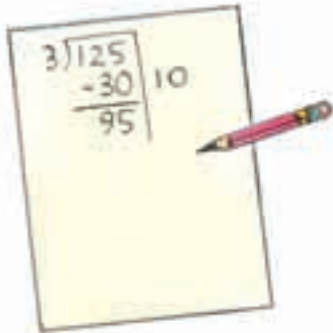
He subtracts multiples of the divisor.

Multiples of 3 are: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, ...

Write  $125 \div 3$  as  $3 \overline{)125}$ .

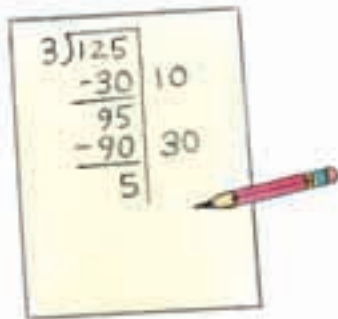
Choose any multiple of 3 less than 125.

Start with 30. Subtract 30.



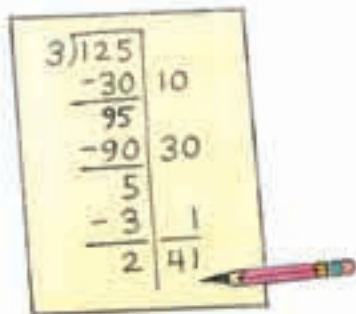
30 is a multiple of 3.  
When I subtract 30, I am  
subtracting 3 ten times.  
So, I write 10 at the side.

Then subtract 90.



90 is a multiple of 3.  
When I subtract 90,  
I am subtracting 3  
thirty times. So, I write  
30 at the side.

Then subtract 3.



When I subtract 3, I write  
1 at the side, because  
 $3 \times 1 = 3$ .  
I add the numbers at the side.  
 $3 \overline{)125}$  is 41 with 2 left over.

$$125 \div 3 = 41 \text{ R}2$$

Each child gets 41¢. There are 2¢ left over.

We ignore the remainder because each child must have the same amount.

## Practice

Use Base Ten Blocks when they help.

1. Divide.

**a)**  $794 \div 2$

**b)**  $263 \div 9$

**c)**  $410 \div 4$

**d)**  $314 \div 6$

2. Divide. Use Base Ten Blocks, then record your answer.

**a)**  $145 \div 5$

**b)**  $189 \div 2$

**c)**  $272 \div 8$

**d)**  $230 \div 6$

**e)**  $344 \div 8$

**f)**  $420 \div 7$

**g)**  $245 \div 9$

**h)**  $328 \div 4$

3. Janelle has a book with 246 pages.

She has to read it in 6 days.

Janelle plans to read the same number of pages each day.

How many pages does she need to read daily?

4. Divide. Which strategy did you use each time?

**a)**  $4 \overline{)484}$

**b)**  $3 \overline{)651}$

**c)**  $6 \overline{)670}$

**d)**  $5 \overline{)715}$

**e)**  $375 \div 8$

**f)**  $274 \div 6$

**g)**  $434 \div 7$

**h)**  $853 \div 4$

5. A baker made 615 loaves of bread in 5 days.

She made the same number of loaves each day.

How many loaves did the baker make each day?



6. Divide.

**a)**  $250 \div 5$

**b)**  $146 \div 5$

**c)**  $165 \div 5$

**d)**  $324 \div 5$

**e)**  $480 \div 5$

**f)**  $487 \div 5$

**g)**  $495 \div 5$

**h)**  $139 \div 5$

Before you divide by 5, how can you tell if there will be a remainder?

7. One hundred forty-eight students are going to Festival du Voyageur in Saint-Boniface, Winnipeg.

They are travelling in equal groups on 4 buses.

How many students will be on each bus?

8. Write a story problem that can be solved by finding  $342 \div 3$ .

Trade problems with a classmate.

Solve your classmate's problem.



9. Without dividing, how can you tell if  $415 \div 5$  has a 3-digit answer or a 2-digit answer? Show your work.

10. Alex is putting his 246 sports cards into an album. He will mount 8 cards on each page.
- a) How many pages will Alex need?
  - b) Explain why you need to think about the remainder.

11. Each student needs a notebook. There are 148 students. There are 8 notebooks in each packet.
- a) How many packets are needed?
  - b) What does the remainder tell you?

12. Two hundred sixty-five slices of tourtière were ordered for a Taste of Québec Day. There are 8 slices in one tourtière.
- a) How many tourtières does the school need to order?
  - b) How many more slices could be sold before the school needs to order another tourtière?
  - c) Suppose the school sold 10 slices less than were ordered. How would that change the number of tourtières needed? Explain your thinking.

13. When you divide a 3-digit number by a 1-digit number, will the answer ever be a 1-digit number? Explain how you know.

14. Kendra has twice as many building blocks as Janet. Janet has twice as many as Fariah. Fariah has 57 blocks. The girls use all the blocks to build 3 identical towers. How many blocks are in each tower? How do you know?



## Reflect

When is the remainder in a division problem ignored?  
When does the remainder indicate that the quotient should be rounded up?  
Use words and numbers to explain an example of each problem.



# Other Strategies for Dividing Whole Numbers

## Explore



A tire factory makes 824 tires a day.  
A new car needs a set of 4 tires.  
How many sets of tires are made each day?

## Show and Share

Share your strategy with that of another pair of students.  
Which strategy do you prefer?  
Why?



## Connect

Some vehicles have 5 tires in a set.  
How many sets of 5 tires can be made with 728 tires?

To find out, divide:  $5 \overline{)728}$

### ► Estimate.

Think of a multiple of 10 that is easy to divide by 5.

728 is about 750.

$$750 \div 5 = 75 \text{ tens} \div 5$$

$$= 15 \text{ tens}$$

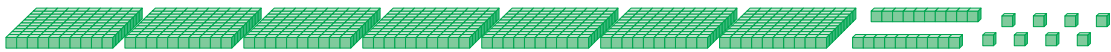
$$= 150$$

So,  $728 \div 5$  is about 150.

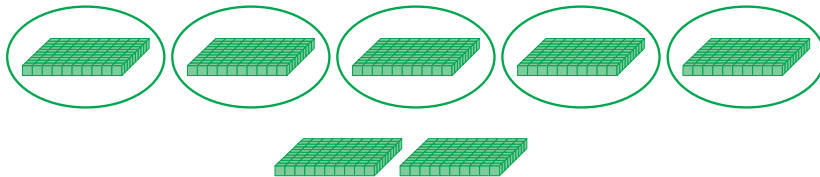




► Use Base Ten Blocks and place value to divide:  $728 \div 5$



Divide 7 hundreds into 5 equal groups.

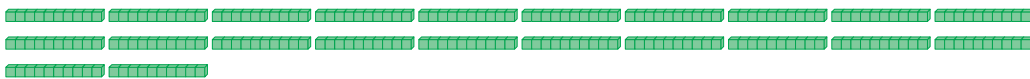


	h	t	o
	1		
5	7	2	8
-	5		
	2		

There are 1 hundred in each group, with 2 hundreds left over.

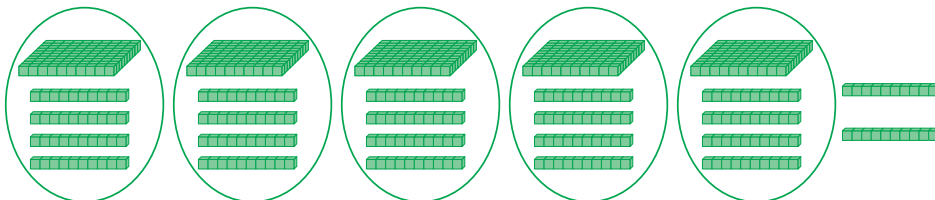
Trade the 2 hundred flats for 20 ten rods.

There are now 22 ten rods.



Divide the 22 ten rods among the 5 equal groups.

There are now 1 hundred 4 tens in each group, with 2 tens left over.



	h	t	o
	1	4	
5	7	2	8
-	5		
	2	2	
-	2	0	
		2	

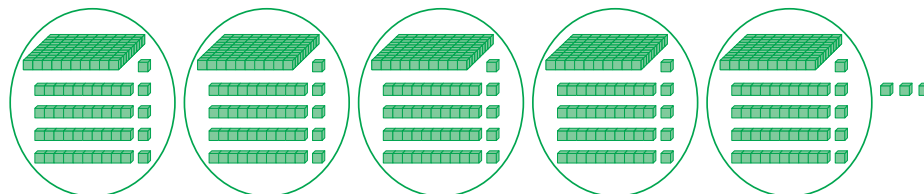
Trade the 2 ten rods for 20 unit cubes.

There are now 28 unit cubes.



Divide the 28 cubes among the 5 equal groups.

There are now 1 hundred 4 tens 5 ones in each group, with 3 ones left over.



	h	t	o
	1	4	5
5	7	2	8
-	5		
	2	2	
-	2	0	
		2	8
-		2	5
			3

There are 145 in each group, with 3 left over.

So,  $728 \div 5 = 145 \text{ R}3$

- Use mental math.

Divide:  $728 \div 5$

Break 728 into numbers you can divide easily by 5.

$$728 = 500 + 200 + 28$$

$$500 \div 5 = 50 \text{ tens} \div 5$$

$$= 10 \text{ tens}$$

$$= 100$$

$$200 \div 5 = 20 \text{ tens} \div 5$$

$$= 4 \text{ tens}$$

$$= 40$$

$$28 \div 5 = 5 \text{ R}3$$

$$\text{So, } 728 \div 5 = 100 + 40 + 5 \text{ R}3$$

$$= 145 \text{ R}3$$

One hundred forty-five sets of tires can be made.

There will be 3 tires left over.

To check, multiply 145 by 5, then add 3.

$$145 \times 5 = 725$$

$$725 + 3 = 728 \leftarrow \text{Since this is the dividend, the answer is correct.}$$

## Practice

1. Find each quotient. Estimate first. Show your work.

a)  $9 \overline{)540}$

b)  $3 \overline{)720}$

c)  $5 \overline{)255}$

d)  $8 \overline{)168}$

e)  $4 \overline{)268}$

f)  $7 \overline{)112}$

g)  $6 \overline{)704}$

h)  $2 \overline{)173}$

i)  $9 \overline{)398}$

j)  $4 \overline{)600}$

k)  $3 \overline{)299}$

l)  $3 \overline{)212}$

2. Divide. Check by multiplying. Show your work.

a)  $925 \div 6$

b)  $537 \div 9$

c)  $588 \div 7$

d)  $831 \div 4$

e)  $108 \div 4$

f)  $311 \div 6$

g)  $284 \div 5$

h)  $606 \div 9$

i)  $667 \div 7$

j)  $424 \div 8$

k)  $903 \div 8$

l)  $418 \div 6$

3. Look at your answers for question 2.

Which quotients had 3 digits? Which had 2 digits?

How can you tell how many digits

the quotient will have before you divide?

4. Most minivans have 3 wiper blades.

How many sets of 3 blades can be made from 342 blades?

5. Gabi has 629 pennies.

She wants to give 90¢ to each of 7 friends.

Can she do it? Explain.



6. Zoomin' Inc. makes skateboards.

In 5 days, 980 skateboards were made.

The same number of skateboards was made each day.

How many skateboards were made each day?

How can you check?

7. Write a division problem that can be solved by dividing a 3-digit number by a 1-digit number.

Trade problems with a classmate.

Solve your classmate's problem.

8. Troy is planning a family reunion.

He estimates that 250 people will attend.

Troy plans one hot dog per person.

Hot dogs come in packages of 6 or 8.

Which type of package should Troy buy?

Justify your answer.

9. The Grades 5 and 6 classes get together for a 5-a-side soccer tournament. There are 133 students.

- a) How many students will not be on a team?

Justify your answer.

- b) Soccer can also be played with 4, 6, or 7 people on a team.

Which size team would provide for the fewest students not on a team?

Justify your answer.

10. Use each of these digits once: 8, 6, 1

Arrange the digits to make a 3-digit number.

How many different 3-digit numbers can you make that have no remainder when divided by 7?

How do you know you have found all of them?



## Reflect

Which strategy for dividing did you find most difficult to use?

Talk to a classmate about the strategy.

Write what you learned about the strategy.

# Target No Remainder!



You will need:

- a spinner with 6 equal sectors, labelled 4 to 9
- 3 number cubes, each labelled 1 to 6

The goal of the game is to get the least remainder.

Take turns.

On your turn, roll all 3 number cubes and spin the pointer.

Arrange the numbers rolled on the number cubes to make a 3-digit number.

Divide the 3-digit number by the number on the spinner.

Record the remainder.

This is your score for this turn.

At the end of the game, total your score.

The player with the lesser total wins.



# Solving Problems

You have used addition, subtraction, multiplication, and division to solve problems with whole numbers.

In this lesson, you will solve problems with more than one step.

## Explore



Rhianna mows lawns and shovels driveways. Last year, she earned \$1252. She mowed 93 lawns for \$8 each. How much money did she earn from shovelling driveways?

## Show and Share

Share your work with another pair of students. Compare your answers and the strategies you used to find them. What did you need to calculate before you could find how much Rhianna earned from shovelling driveways? Explain.



## Connect

- Robert spent \$1478 on stamps and coins for his collection. He bought 14 stamps for \$37 each. How much did Robert spend on coins?

To find the amount Robert spent on coins, we first need to find out how much he spent on stamps.



Multiply:  $14 \times 37$

Use expanded form, then partial products.

$$\begin{aligned} 14 \times 37 &= (10 + 4) \times (30 + 7) \\ &= (10 \times 30) + (10 \times 7) + (4 \times 30) + (4 \times 7) \\ &= 300 + 70 + 120 + 28 \\ &= 370 + 148 \\ &= 518 \end{aligned}$$

	30	7
10	$10 \times 30$	$10 \times 7$
4	$4 \times 30$	$4 \times 7$

Robert spent \$518 on stamps.

Find how much Robert spent on coins.

Subtract the amount he spent on stamps from the total amount he spent.

Subtract:  $1478 - 518$

$$1478 - 518 = 960$$

Robert spent \$960 on coins.



- Mackenzie uses 16 m of fabric to make 4 outfits from one pattern.

How much fabric would she need to make 9 outfits from the same pattern?

To find the amount of fabric she needs for 9 outfits, we first need to know how much fabric she needs for 1 outfit.

$$\text{Divide: } 16 \div 4 = 4$$

Mackenzie needs 4 m of fabric to make 1 outfit.

Multiply the amount of fabric needed for 1 outfit by the number of outfits, 9.

$$4 \times 9 = 36$$

Mackenzie needs 36 m of fabric to make 9 outfits from the pattern.

## Practice

1. Campbell bought 48 hardcover books. Each book cost \$35.
  - a) How much did Campbell spend on books?
  - b) Write a story problem that uses your answer to part a.  
Trade problems with a classmate.  
Solve your classmate's problem.
  - c) Compare your problem to your classmate's problem.

2. For each problem, describe what you need to find before you can solve the problem.
- a) At Sam's Office Supply, a package of 3 colour inkjet cartridges costs \$216.  
At Ink World, the same brand of cartridge costs \$79 each.  
How much more does a colour cartridge cost at Ink World?
- b) Karen booked the computer for 2 hours.  
She spent 75 minutes typing a report and 32 minutes checking her work.  
How much computer time does Karen have left?
3. The Lakeland District choir stood in rows of 12 for a performance.  
The people in 2 rows carried red streamers.  
The people in 4 rows carried yellow streamers.  
The people in 3 rows carried purple streamers.  
How many people are in the choir?



4. Pierre-Luc runs 2 m every second.  
A cheetah runs 29 m every second.
- a) How much farther than Pierre-Luc will the cheetah run in 9 seconds?
- b) Explain how you solved the problem.
5. Kamil played a game 3 times.  
His first score was 1063 points.  
His second score was 129 points lower.  
His third score was 251 points higher than his second score.  
How many points did Kamil score in his third game?
6. Three people are sharing the costs for a barbecue equally.  
Alison buys the meat for \$157.  
Brent buys the pop and juice for \$124.  
Ahmed buys the salads, buns, and desserts for \$136.  
How much should each person pay? Justify your answer.



### Reflect

What clues do you use to find out if you need to add, subtract, multiply, or divide to solve a problem?

## Explore



Samrina organized a team to participate in a 325-km bike relay.  
Half the team members ride 25 km.  
The rest ride 40 km.  
Including Samrina, how many people are on Samrina's team?



## Show and Share

Describe the strategy you used to solve the problem.  
How could you solve the problem a different way?

## Connect

Mr. Tremblay bought resource books for \$28 each and bookshelves for \$84 each.  
He spent \$616 on 12 items.  
How many of each item did Mr. Tremblay buy?

## Strategies

- Make a table.
- Use a model.
- Draw a diagram.
- Solve a simpler problem.
- Work backward.
- Guess and test.
- Make an organized list.
- Use a pattern.
- Draw a graph.

What do you know?

- Resource books cost \$28 each.
- Bookshelves cost \$84 each.
- The total number of books and bookshelves is 12.
- The total cost is \$616.

Think of a strategy to help you solve the problem.

You could **make an organized list** in a table.

- Choose a number for the bookshelves bought and another number for the books bought.
- Find the total cost of bookshelves and books.



Find the cost of 1 bookshelf.  
 Find the cost of 11 books.  
 Record the costs in an organized list.  
 Find the total cost. Is it \$616?  
 If not, find the cost of 2 bookshelves and 10 books.  
 Continue until the total cost is \$616.

Number of Bookshelves	Cost (\$)	Number of Books	Cost (\$)	Total Cost (\$)
1	84	11	308	392



Check your work.  
 Is the total number of books and bookshelves 12?  
 Is the total cost of books and bookshelves \$616?

## Practice

Choose one of the

## Strategies

- Colin's grandma gave him \$100.  
 He bought a game for \$61.  
 He wants to buy another game that costs \$47.  
  - Does Colin have enough money? How do you know?
  - If your answer to part a is yes, how much will Colin have left after he buys the game?  
 If your answer to part a is no, how much more money does Colin need?
- Together, two bicycles cost \$300.  
 One bicycle costs \$40 more than the other.  
 What is the cost of the cheaper bicycle?



## Reflect

When is "make an organized list" a useful strategy for solving problems?

## LESSON

1

1. Write as many related facts as possible for each set of numbers.  
a) 9, 9, 81      b) 7, 9, 63      c) 0, 0, 8      d) 6, 9, 54
2. Write a multiplication fact that can help you find each quotient.  
a)  $54 \div 6$       b)  $48 \div 6$       c)  $27 \div 9$       d)  $40 \div 8$
3. Léa knows the product of 8 and 9 is 72.  
How can she use that fact to find the product of 7 and 9?

2

4. How can you use  $5 \times 10$  to find  $9 \times 5$ ? Explain your strategy.
5. How can you use  $4 \times 7$  to find  $8 \times 7$ ? Explain your strategy.
6. How can you use repeated halving to find  $68 \div 4$ ?
7. Sami bought 8 paperback books for \$6 each, including tax.  
a) How much did the books cost?  
b) How could you use repeated doubling to find out?

3

8. Multiply. How can you use what you know about basic facts to help you?  
a)  $8 \times 7000$       b)  $50 \times 90$       c)  $8 \times 500$       d)  $60 \times 60$

4

9. Which compatible numbers would you use to estimate each product?  
a)  $9 \times 73$       b)  $810 \times 4$       c)  $39 \times 52$       d)  $126 \times 8$

10. Estimate each product.

Tell whether your estimate is an overestimate, an underestimate, or why you cannot tell.

- a)  $89 \times 9$       b)  $54 \times 38$       c)  $785 \times 6$       d)  $7 \times 456$

11. Raffi's stamp album has 35 pages.

There are 48 stamps on each page.

About how many stamps are in Raffi's album?

5

12. Use mental math to multiply. Explain your strategy each time.  
a)  $32 \times 25$       b)  $50 \times 78$       c)  $699 \times 6$       d)  $5 \times 92$



# LESSON

6  
8

13. Multiply or divide.

a)  $32 \times 65$

b)  $760 \div 8$

c)  $80 \times 56$

d)  $188 \div 6$

6

14. Jacob has ninety-seven \$20 bills.  
How much money does he have?

15. Sandra bought 17 CDs for \$23 each.  
How much did she spend on CDs?



7

16. There are 265 students in Mountview Elementary School.  
There are 9 classes. About how many students are in each class?

8

17. Divide, then check.

a)  $5 \overline{)625}$

b)  $338 \div 2$

c)  $4 \overline{)750}$

d)  $382 \div 8$

9

18. Use mental math or place value to divide.

a)  $635 \div 5$

b)  $738 \div 9$

c)  $444 \div 6$

d)  $576 \div 8$

19. Bedding plants are sold in trays of 6.  
How many trays are needed to hold 340 plants?

10

20. At Marg's Market, you can buy  
6 boxwood plants for \$354.  
At Green Gardens, the same size  
of boxwood plant costs \$53.  
Which store has the better price  
on boxwood plants?  
How do you know?

21. An apartment building has 32 one-bedroom  
apartments, 24 two-bedroom apartments,  
and 16 three-bedroom apartments.  
How many bedrooms are in the building?



UNIT

3

## Learning Goals

- ☒ find basic multiplication facts to 81 and the related division facts
- ☒ use different strategies to estimate products and quotients
- ☒ estimate to solve problems
- ☒ use different strategies to multiply mentally
- ☒ multiply a 2-digit number by a 2-digit number
- ☒ divide a 3-digit number by a 1-digit number

## Unit Problem

# On the Dairy Farm



Silage is made from green corn plants. The whole plant is harvested, chopped, and fermented in a storage silo.



Haylage is hay that has been cut, chopped, and stored moist.



Each day, a cow eats:

- 5 kg of hay
- 9 kg of haylage
- 9 kg of corn silage
- 10 kg of dairy ration

A cow also needs minerals and salt, and eighty to one hundred sixty litres of water each day.

## Check List

Your work should show

- ☒ that you can choose the correct operation to solve problems
- ☒ all calculations in detail
- ☒ a challenging story problem using whole numbers
- ☒ a clear explanation of how you solved your story problem



1. Amy has 43 dairy cows on her farm.  
How many kilograms of feed will she use each day?
2. Simon has 72 hectares of field on his farm.  
He plans to use 4 parts to plant hay, 1 part to plant corn,  
and 1 part as cow pasture.  
How many hectares of field will he use for each purpose?
3. The Allards can milk 14 cows at a time in their milking parlour.  
It takes a milking machine about 5 minutes to milk a cow.  
About how long will it take the machines to milk all 90 cows?
4. Write a story problem about a dairy farm.  
Solve your problem.  
How did you solve the problem?

1 hectare is equal  
to 10 000 m<sup>2</sup>.

## Reflect on Your Learning

Choose one strategy for multiplication and  
one for division.

Use an example to show when you might use  
each strategy.

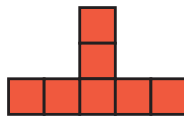


## UNIT

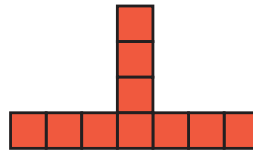
1. The first 2 terms of a pattern are 3 and 5.  
Write 5 different patterns that start with these 2 terms.  
List the first 6 terms for each pattern.  
Write each pattern rule.
2. Choose one pattern from question 1.  
Use counters to show the pattern.  
Sketch the counters you used.
3. Here is a pattern made with square tiles.  
The side length of each square is 1 unit.  
The pattern continues.



Frame 1



Frame 2



Frame 3

- a) Find the perimeter of each frame.  
Record the frame number and the perimeter in a table.
- b) Predict the perimeter of Frame 12. How did you do this?
- c) Does any frame have a perimeter of 40 units? 50 units?  
How do you know?

Frame number	Perimeter (units)

4. Solve each equation.  
a)  $16 + n = 20$     b)  $16 - m = 5$     c)  $16 = 2e$     d)  $16 = r \div 2$
5. For each equation in question 4, write a story problem you could use the equation to solve.

6. a) How many tens are in 6000?    b) How many hundreds are in 6000?  
c) How many thousands are in 6000?
7. a) Write this number in standard form:  $900\,000 + 60\,000 + 300 + 5$   
b) Write this number in words: 805 601  
c) Write this number in expanded form: 710 543

8. Use the 2 digits of your age and the 4 digits of the year you were born.
- a) Write the greatest number with those 6 digits.
  - b) Write the least number with those 6 digits.
  - c) Write 3 numbers between the numbers you wrote in parts a and b.
9. Estimate to find the differences that are less than 2000.
- a)  $5697 - 3748$     b)  $9876 - 6789$     c)  $4005 - 2010$     d)  $8332 - 7441$

10. Janelle is travelling with her family.

She keeps a record of how far she travels each day.

Here is Janelle's data for one week.

Day	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
Distance (km)	658	132	754	37	458	207	856

- a) Estimate how far Janelle travelled at the weekend.  
Which strategy did you use?
- b) Estimate how far Janelle travelled on Wednesday, Thursday, and Friday.  
Did you use a different strategy this time? If so, explain why.

3

11. Suppose you know that  $2 \times 4 = 8$ .  
Which other facts can you find by repeated doubling?
12. In a parking lot, there are 59 rows of parking spaces.  
There are 25 spaces in each row.  
About how many cars can park in the lot? Show your work.
13. Draw a diagram to help find each product.
- a)  $304 \times 5$     b)  $297 \times 8$
14. Estimate each quotient. Which strategy did you use each time?
- a)  $136 \div 3$     b)  $250 \div 6$     c)  $387 \div 9$     d)  $507 \div 7$
15. For a school fund-raiser, Kyle helped his dad bake 456 cookies in 3 days. They baked the same number of cookies each day.
- a) How many cookies did Kyle and his dad bake each day?
  - b) Kyle wraps cookies in packages of 5 cookies to sell.  
How many packages can he make? Explain your answer.