PA5-9 Unknown Quantities and Equations

1. Some apples are inside a bag and some are outside the bag. The total number of apples is shown. Draw the missing apples in the bag.

a)

total number of apples

b)

c)

d)
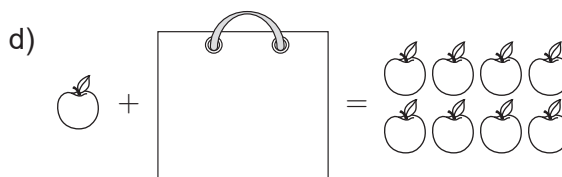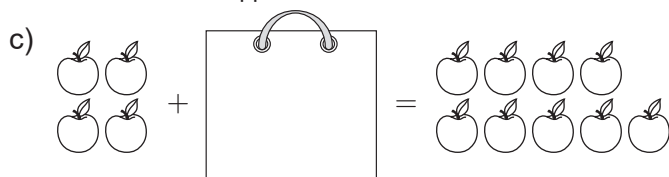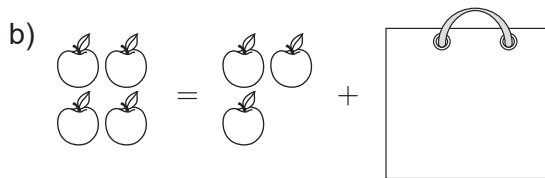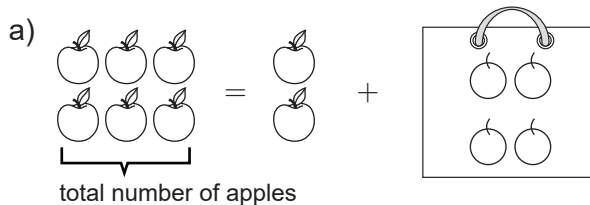
2. Draw the missing apples in the bag. Then write an equation (with numbers) to represent the picture.

a)

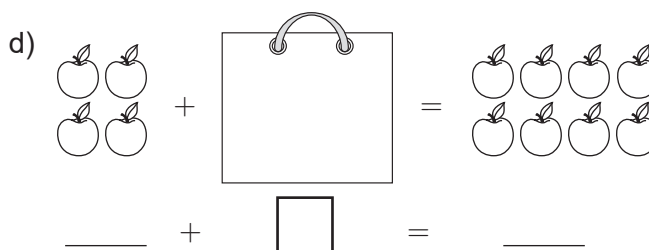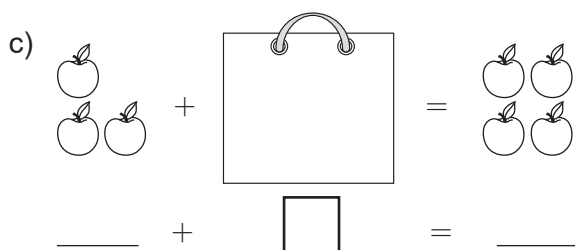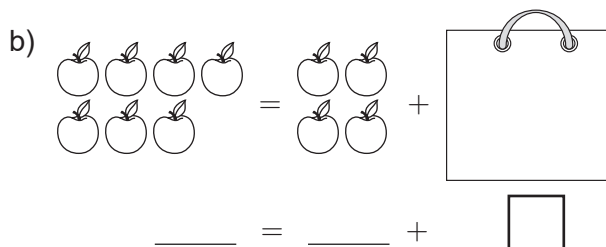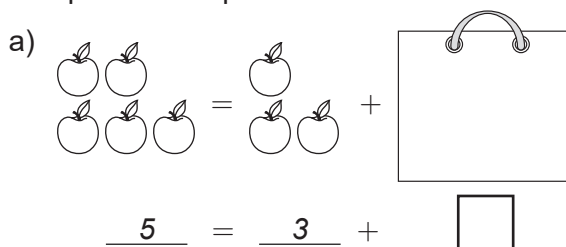$$\underline{\quad 5 \quad} = \underline{\quad 3 \quad} + \boxed{}$$

b)

$$\underline{\qquad} = \underline{\qquad} + \boxed{}$$

c)

$$\underline{\qquad} + \boxed{} = \underline{\qquad}$$

d)

$$\underline{\qquad} + \boxed{} = \underline{\qquad}$$

3. Write an equation for each problem. Use a box for the unknown quantity.

a) There are 7 apples altogether. There are 4 outside a basket. How many are inside?

$$\underline{\quad 7 \quad} = \underline{\quad 4 \quad} + \boxed{}$$

b) There are 9 apples altogether. There are 7 outside a basket. How many are inside?

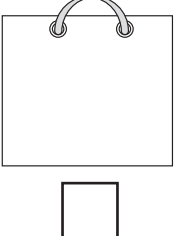$$\underline{\qquad} = \underline{\qquad} + \boxed{}$$

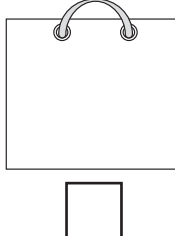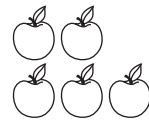c) There are 11 plums altogether. There are 5 inside a bag. How many are outside?

d) 17 students are at the library. There are 9 in the computer room. How many are outside the computer room?

4. Jun took some apples from a bag. Show how many apples were in the bag originally.

a)

Jun took away this many.   This is how many were left.

b)
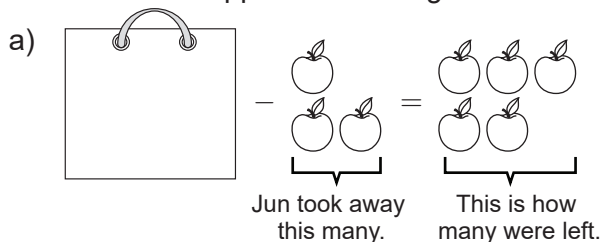
5. Show how many apples were in the bag originally. Then write an equation to represent the picture.

a)

$$\boxed{} - 4 = 3$$

b)

$$\boxed{} - 2 = 5$$

6. Find the number that makes the equation true and write it in the box.

a) $\boxed{6} + 3 = 9$

b) $\boxed{} + 4 = 9$

c) $\boxed{} + 5 = 9$

d) $8 - \boxed{} = 5$

e) $13 - \boxed{} = 11$
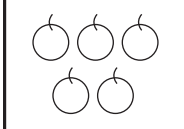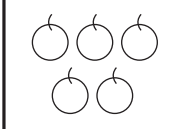
f) $19 - \boxed{} = 8$

g) $3 + 6 = 5 + \boxed{}$

h) $10 - 3 = \boxed{} + 4$
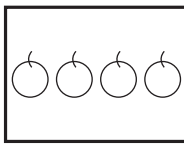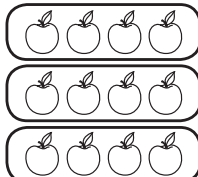
i) $1 + 5 = 7 - \boxed{}$

7. Draw the same number of apples in each box. Write the equation for the picture.
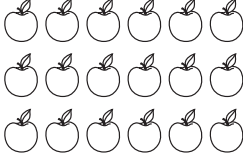
a)

$$\boxed{} + \boxed{} = 10$$
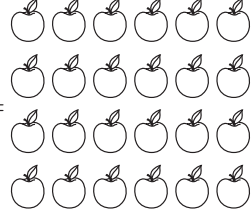
b)

8. Draw a picture for the equation. Use your picture to solve the equation.

a) $3 \times = $

$3 \times \boxed{4} = 12$

b) $2 \times = $

$2 \times \boxed{} = 10$

c) $3 \times = $

$3 \times \boxed{} = 18$

d) $ \times 6 = $

$\boxed{} \times 6 = 24$

9. How many apples should be in the box? Write the number.

a) $2 \times \boxed{3} =$ 🍎🍎🍎 🍎🍎🍎

b) $2 \times \boxed{} =$ 🍎🍎 🍎🍎

c) $\boxed{} \times 3 =$ 🍎🍎🍎 🍎🍎🍎

d) $\boxed{} \times 4 =$ 🍎🍎🍎🍎 🍎🍎🍎🍎

e) $3 \times$ 🍎🍎🍎 🍎🍎🍎 $= \boxed{}$

f) $3 \times$ 🍎🍎 🍎🍎 $= \boxed{}$

g) $8 \times$ 🍎🍎 🍎 $= \boxed{}$

h) $7 \times$ 🍎🍎 🍎🍎 $= \boxed{}$

BONUS ▶ There are 13 apples in the bag. What number goes in the box?

$4 \times \left(\text{🛍} \text{🍎} \text{🍎} \right) = \boxed{}$

> Use circles instead of apples to make your drawing simpler.

10. Draw a picture of each equation. Then solve the equation using your picture.

a) $3 \times 4 = \boxed{}$

b) $3 \times \boxed{} = 18$

11. Solve the equation by guessing and checking.

a) $6 \times \boxed{} = 30$

b) $\boxed{} \times 2 = 18$

c) $2 \times \boxed{} = 24$

d) $\boxed{} \times 7 = 42$

e) $24 \div \boxed{} = 6$

f) $\boxed{} \div 5 = 6$

g) $5 \times 4 = \boxed{} \times 10$

h) $12 \times 3 = 9 \times \boxed{}$

12. Solve the equation by writing the unknown by itself.

a) $3 \times \boxed{} = 18$

b) $\boxed{} \times 7 = 28$

c) $\boxed{} \div 4 = 5$

d) $12 \div \boxed{} = 6$

e) $\boxed{} \times 8 = 32$

f) $\boxed{} \div 5 = 7$

g) $24 \div \boxed{} = 4$

h) $30 \div \boxed{} = 2$

PA5-10 Translating Words into Expressions

1. Match the description with the correct numerical expression.

   a) 2 more than 6 4×6

      6 divided by 3 $6 - 2$

      2 less than 6 $6 + 2$

      the product of 6 and 4 $6 - 3$

      6 decreased by 3 $6 \div 3$

   b) 2 divided into 11 3×11

      11 reduced by 4 $11 \div 2$

      11 times 3 $11 + 3$

      twice as many as 11 $11 - 4$

      11 increased by 3 2×11

2. Write an expression for each description.

   a) 4 more than 3 ___*3 + 4*___

   b) 15 decreased by 8 _____

   c) 24 divided by 8 _____

   d) 2 less than 9 ___*9 − 2*___

   e) 67 increased by 29 _____

   f) 35 added to 4 _____

   g) twice as many as 5 _____

   h) 15 divided by 5 _____

   i) the product of 7 and 4 _____

   j) 5 times 8 _____

3. Turn the written instructions into mathematical expressions.

   a) Add 8 and 3. ___*8 + 3*___

   b) Divide 6 by 2. _____

   c) Add 34 and 9. _____

   d) Subtract 5 from 7. _____

   e) Multiply 42 and 2. _____

   f) Decrease 3 by 2. _____

   g) Add 8 and 4. Then divide by 3. _____

   h) Divide 8 by 4. Then add 5. _____

   i) Divide 4 by 2. Then add 10. Then subtract 4. _____

   j) Multiply 6 and 5. Then subtract 20. Then divide by 2. _____

4. Write the mathematical expressions in words.

   a) $(6 + 2) \times 3$ ___*Add 6 and 2. Then multiply by 3.*_____

   b) $(6 + 1) \times 2$ _____

   c) $12 - 5 \times 2$ _____

   d) $(3 - 2) \times 4$ _____

   BONUS ▶

   $4 \times (3 - 1 + 5)$ _____

5. How far will a motorcycle travel at the speed and in the time given? Write the numerical expression.

a) Speed: 60 km per hour
Time: 2 hours

Distance: ___60 × 2___ km

b) Speed: 80 km per hour
Time: 4 hours

Distance: _____ km

c) Speed: 70 km per hour
Time: 5 hours

Distance: _____ km

6. a) Look at the sign below, then write a numerical expression for the cost of renting a bike for …

i) 1 hour: ___5 × 1___ ii) 2 hours: _____ iii) 4 hours: _____

b) Complete the description of the expression.

i) 5 × 3 is the cost of renting a bike for __3__ hours.

ii) 5 × 2 is the cost of renting a bike for ____ hours.

iii) 5 × 5 is the cost of renting a bike for ____ hours.
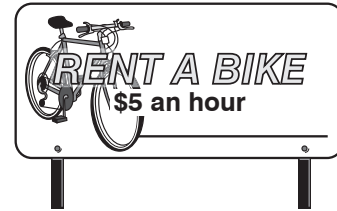
RENT A BIKE
$5 an hour

7. a) A different rental company charges $3 for each hour. Write the numerical expression for the cost of renting a bike for …

i) 1 hour: ___3 × 1___ ii) 2 hours: _____ iii) 4 hours: _____

b) Complete the description of the expression.

i) 3 × 3 is the cost of renting a bike for __3__ hours.

ii) 3 × 2 is the cost of renting a bike for ____ hours.

iii) 3 × 5 is the cost of renting a bike for ____ hours.

8. A field trip for a Grade 5 class costs $11 per student plus $2 for a snack.

a) Write an expression to represent the cost for 1 student and 1 snack. _____

b) Write an expression to represent the cost for 3 students and 3 snacks. _____

BONUS ▶ Write a word problem that could be represented by 19 × (11 + 2).

9. A day pass can be used by 2 adults and 2 children for unlimited one-day bus travel on weekends. Write an expression to represent the number of day passes that are needed for 10 adults and 10 children. Hint: The number of adults and the number of children are the same.

BONUS ▶ 20 students from each class go to the museum. There are 5 classes, along with 13 teachers and 16 parents.

a) Write an expression to represent the number of people who go to the museum.

b) How many buses will be needed if 30 people ride in each bus?

PA5-11 Variables

1. Look at the sign at the right, then write a numerical expression
   for the cost of renting skates for …

   a) 2 hours: ___3 × 2___   b) 5 hours: _____

   c) 6 hours: _____   d) 8 hours: _____

RENT SKATES
$3 an hour

A **variable** is a letter or symbol (such as *x*, *n*, or *H*) that represents a number.

To make an **algebraic expression**, replace some numbers in a numerical expression with variables.

Examples of algebraic expressions: $x + 1$ $3 + 4 \times T$ $2 + t - 3 \times h$

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2. Write an expression for the distance a car would travel at the given speed and time.

   a) Speed: 60 km per hour   b) Speed: 80 km per hour   c) Speed: 70 km per hour

   Time: 2 hours   Time: 3 hours   Time: *h* hours

   Distance: _____ km   Distance: _____ km   Distance: _____ km

---

In the product of a number and a variable, the multiplication sign is usually dropped.

Examples: $3 \times T$ can be written $3T$ and $5 \times z$ can be written $5z$.

---

3. Look at the sign at the right, then write an algebraic expression
   for the cost of renting skis for …

   a) *h* hours: __5 × h__ or __5h__   b) *t* hours: _____ or _____

   c) *x* hours: _____ or _____   d) *n* hours: _____ or _____

RENT SKIS
$5 an hour

4. Write an equation that tells you the relationship between the numbers in Column A
   and Column B. Hint: First find the number that you need to add or multiply.

a)

A	B
1	4
2	5
3	6

___$A + 3 = B$___

b)

A	B
1	2
2	4
3	6

___$2 \times A = B$___
___*or* $2A = B$___

c)

A	B
1	3
2	4
3	5

_____

d)

A	B
1	3
2	6
3	9

_____
_____

e)

A	B
1	5
2	10
3	15

_____
_____

When replacing a variable with a number, we use brackets.

Example: Replacing *n* with 7 in the expression 3*n* gives 3(7), which is another way to write 3×7.

5. Write the number 2 in the brackets and evaluate.

a) 5 (2) = _5 × 2_ = __10__

b) 3 (   ) = _____ = _____

c) 4 (   ) = _____ = _____

d) 2 (   ) + 5

    = __2 × 2 + 5__ = __4 + 5__

            = __9__

e) 4 (   ) − 2

    = _____ = _____

            = _____

f) 6 (   ) + 3

    = _____ = _____

            = _____

6. Replace *n* with 2 in each expression and evaluate.

a) 4*n* + 3

    4(2) + 3

    = 8 + 3 = 11

b) 5*n* + 1

c) 3*n* − 2

d) 2*n* + 3

e) 4*n* − 3

f) 2*n* − 4

7. Replace the variable with the given number and evaluate.

a) 5*h* + 2,   *h* = 3

    5(3) + 2

    = 15 + 2 = 17

b) 2*n* + 3,   *n* = 6

c) 5*t* − 2,   *t* = 4

d) 3*m* + 9,   *m* = 8

e) 9 − *z*,   *z* = 4

f) 3*n* + 2,   *n* = 5

8. Evaluate each expression.

a) 2*n* + 3,   *n* = 5

    2(5) + 3

    = 10 + 3 = 13

b) 2*t* + 3,   *t* = 5

c) 2*w* + 3,   *w* = 5

9. What do you notice about your answers to Question 8? _____

Why is that so? _____

_____

Patterns and Algebra 5-11

PA5-12 Totals, Differences, and Equations

1. Fill in the table. Write *x* for the number you are not given.

		Blue Balloons	Red Balloons	Total Balloons	Another Way to Write the Total
a)	9 blue balloons 17 balloons in total	9	x	17	9 + x
b)	15 blue balloons 13 red balloons				
c)	31 balloons in total 18 blue balloons				
d)	17 red balloons 23 balloons altogether				
e)	34 red balloons 21 blue balloons				

> When you can write the same number two ways, you can write an equation.
>
> Example: 9 blue balloons, *x* red balloons, 17 balloons in total
>
> Write the total two ways to get an equation: $9 + x = 17$

2. Circle the total in the story. Then write an equation.

   a) 15 blue balloons
   28 balloons altogether
   x red balloons

   $\underline{\quad 15 + x = 28 \quad}$

   b) 12 blue balloons
   14 red balloons
   x balloons altogether

   $\underline{\qquad\qquad\qquad}$

   c) 27 balloons altogether
   19 red balloons
   x blue balloons

   $\underline{\qquad\qquad\qquad}$

   d) There are 13 red apples.
   There are *x* green apples.
   There are 27 apples in total.

   $\underline{\qquad\qquad\qquad}$

   e) There are *x* red apples.
   There are 14 green apples.
   There are 39 apples in total.

   $\underline{\qquad\qquad\qquad}$

   f) There are 55 red apples.
   There are 16 green apples.
   There are *x* apples in total.

   $\underline{\qquad\qquad\qquad}$

3. Circle the total in the story. Then write an equation and solve it.

   a) There are 9 cats.
   There are 12 dogs.
   There are *x* pets altogether.

   $\underline{\qquad\qquad\qquad}$

   $\underline{\qquad\qquad\qquad}$

   b) There are 19 stickers.
   x of them are black.
   11 of them are not black.

   $\underline{\qquad\qquad\qquad}$

   $\underline{\qquad\qquad\qquad}$

   c) Kim has 9 friends.
   x of them are in Grade 6.
   6 friends are in Grade 5.

   $\underline{\qquad\qquad\qquad}$

   $\underline{\qquad\qquad\qquad}$

CA 5.2 AP U8 PA8-16 p1-19 V4.indd   9   2019-09-10   11:34:05 AM

> larger part − smaller part = difference
>   9   −   x   =   4
> 9 is 4 more than *x*. *x* is 4 fewer than 9. So *x* = 9 − 4 and now the variable *x* is by itself.

4. Fill in the table. Write *x* for the number you are not given. Circle the larger part and then write the difference another way.

		Parts		Difference	Another Way to Write the Difference
		Apples	Oranges		
a)	13 apples, 5 more oranges than apples	13	(x)	5	x − 13
b)	9 more oranges than apples, 12 apples				
c)	6 apples, 7 oranges				
d)	19 oranges, 8 fewer apples than oranges				
e)	27 oranges, 13 fewer oranges than apples				

5. Circle the part that is larger. Write the difference two ways to make an equation.

a) (8 apples)
    3 fewer oranges than apples
    x oranges

    $8 - x = 3$

b) 5 apples
    13 oranges
    x more oranges than apples

    _____

c) 12 more apples than oranges
    5 oranges
    x apples

    _____

6. Circle the part that is larger. Write the difference two ways to make an equation. Then solve the equation.

a) There are (7 games.)
    There are *x* books.
    There are 5 more games than books.

b) There are *x* games.
    There are 12 books.
    There are 6 fewer games than books.

c) There are 12 games.
    There are 29 books.
    There are *x* fewer games than books.

d) There are 17 pens.
    There are *x* pencils.
    There are 8 more pens than pencils.

e) Tom has 19 stickers.
    Avril has *x* stickers.
    Tom has 13 fewer stickers than Avril.

f) Eric's class has *x* students.
    Amy's class has 34 students.
    Eric's class has 6 fewer students than Amy's class.

7. Fill in the table. Write *x* for the number you are not given.

	Problem	Parts	How Many?	Equation and Solution
a)	Alex has 22 jazz songs in his collection. He has 8 more jazz songs than pop songs. How many pop songs does he have?	*jazz songs*	(22)	$22 - x = 8$ $22 - 8 = x$ $14 = x$
		pop songs	*x*	
b)	Dory has 21 red balloons. She has 9 green balloons. How many more red balloons than green balloons does she have?			
c)	There are 7 apples in the fridge. There are 4 more oranges than apples in the fridge. How many oranges are there?			
d)	Female European wolves weigh 4 kg less than male wolves. Males weigh 38 kg. How much do females weigh?			

8. Write the difference two ways to write an equation. Then solve the equation.

a) Simon exercised for 25 minutes on Saturday. On Sunday he exercised for 17 minutes more than on Saturday. For how long did he exercise on Sunday?

$$\underline{\quad x - 25 = 17 \quad}$$

$$\underline{\quad x = 17 + 25 \quad}$$

$$\underline{\quad = 42 \quad}$$

b) There are 32 teachers in the school. There are 18 fewer volunteers than teachers. How many volunteers are there?

$$\underline{\qquad\qquad\qquad}$$

$$\underline{\qquad\qquad\qquad}$$

$$\underline{\qquad\qquad\qquad}$$

c) North American wolves weigh 36 kg. Indian–Arabian wolves weigh 11 kg less. How much do Indian–Arabian wolves weigh?

d) Jasmin biked 13 km on Saturday. She biked 5 km more on Sunday than on Saturday. How many kilometres did she bike on Sunday?

e) Raj counted 68 cars in a parking lot on Monday and 39 cars on Tuesday. How many fewer cars were parked there on Tuesday?

BONUS ▶ Grace's art exhibition had 658 visitors on the first night. The next night, there were 18 more visitors than on the first night. How many visitors came on the second night?

PA5-13 Problems and Equations—Addition and Subtraction

1. Fill in the table. Write *x* for the number you need to find. Cross out the cell you do not use.

	Problem	Parts	How Many?	Difference / Total	Equation and Solution
a)	Ethan has 2 dogs and 5 fish. How many pets does he have?	dogs	2	Difference: ~~____~~	$2 + 5 = x$
		fish	5	Total: __x__	$x = 7$
b)	Sharon hiked 9 km on Saturday. She hiked 12 km on Sunday. How far did Sharon hike in two days?			Difference: _____	
				Total: _____	
c)	Luc saved $36 in January. He saved $17 less in February than in January. How much money did he save in February?			Difference: _____	
				Total: _____	
d)	The Leviathan roller coaster is 93 m tall. It is 25 m taller than the Yukon Striker roller coaster. How tall is the Yukon Striker?			Difference: _____	
				Total: _____	
e)	A supermarket sold 164 bags of white and yellow potatoes. If 76 of the bags were filled with white potatoes, how many bags of yellow potatoes were sold?			Difference: _____	
				Total: _____	

2. Write the parts and how many of each part. Then write and solve an equation.

   a) Cam has 12 blue marbles. He has 9 more red marbles than blue marbles. How many red marbles does he have?

   b) Cam also has 7 fewer green marbles than red marbles. How many green marbles does he have?

   c) How many red, blue, and green marbles does Cam have altogether? _____

Write an equation to solve the problems on this page.

3. There are 32 children in a class. 13 of them wear eyeglasses.

   a) How many students don't wear eyeglasses?

   b) How many more students are there who don't wear eyeglasses than students who wear eyeglasses?

4. Rani bought 8 hockey cards and 10 baseball cards. She gave away 3 cards.

   a) How many cards did she buy altogether?

   b) How many cards does she have left?
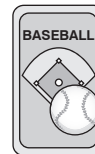
**5.** Neka is three years older than Megan. Megan is 9 years old. How old is Neka?

6. Anton bought a science-fiction novel for $11 and a graphic novel for $7.

   a) How much more expensive is the science-fiction novel than the graphic novel?

   b) How much did the books cost in total?

7. Nina watched TV for 60 minutes. She spent 20 minutes less on her homework than on watching TV. How much time did she spend on homework?

8. A recreation pass costs $23. It is $8 more than a movie pass. How much does the movie pass cost?

9. The Willis Tower in Chicago, USA, is 442 m tall. The CN Tower in Toronto is 553 m tall. How much taller is the CN Tower than the Willis Tower?
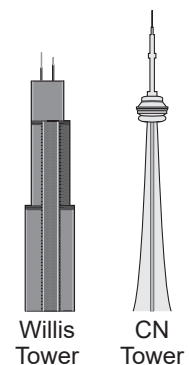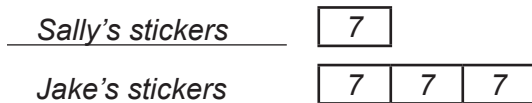
Willis Tower   CN Tower

1. Draw a diagram to model the story.

   a) Sally has 7 stickers. Jake has 3 times as many stickers as Sally does.

 | Sally's stickers | 7 | | |
   |---|---|---|---|
   | Jake's stickers | 7 | 7 | 7 |

   b) There are 5 blue marbles. There are 4 times as many red marbles.

   _____

   _____

   c) There are 12 red apples. There are 4 times as many green apples as red apples.

   _____

   _____

   d) Yu has 4 stickers. Nora has 5 times as many stickers.

   _____

   _____

2. Solve the problem by drawing a model.

   a) Jin has 5 stickers. Rob has 3 times as many stickers as Jin. How many stickers do they have together?

Jin's stickers: 5	5		
Rob's stickers: 15	5	5	5
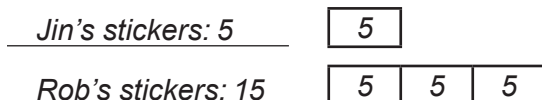
   5 + 15 = 20, so Jin and Rob have

   20 stickers altogether.

   b) Randi studies rats and hamsters. She has 7 rats and twice as many hamsters. How many animals does she have altogether?

   _____

   _____

   _____

   _____

   c) There are 12 chocolate chip cookies in a box. There are 6 times as many oatmeal cookies in the box. How many cookies are there altogether?

   d) There are 17 math books in a school library. There are 4 times as many science books in the library. How many math books and science books are in the library altogether?

3. Draw a model for the story. Then write the given number beside the correct bar.

   a) There are 24 mangoes. There are 4 times as many mangoes as avocados.
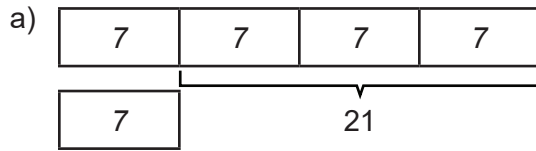
Mangoes: 24				
Avocados:				

   b) There are 30 seniors in the audience. There are 6 times as many seniors as children.

   _____

   _____

   c) Matt spent $24 on shoes and twice as much on pants.

   _____

   _____

   d) Abella studied math for 30 minutes and science for 3 times as many minutes.

   _____

   _____

4. All the blocks are the same size. What is the size of each block?

a)
7	7	7	7

7	21

b)

	32

c)

⎬total: 36

d)

⎬total: 48
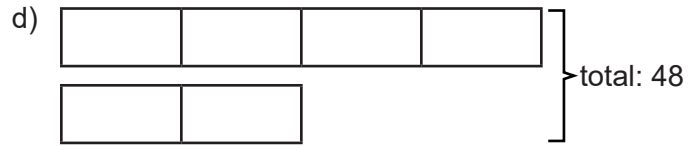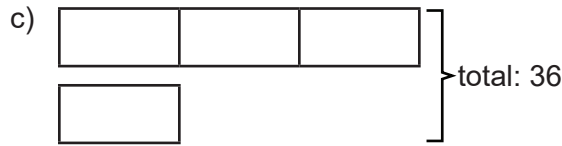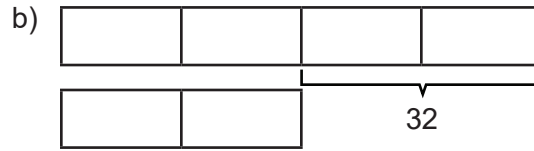
5. Draw the model. Find the length of one block in the model. Then solve the problem.

a) Jay has 3 times as many cards as Sam. Jay has 12 more cards than Sam. How many cards does each person have?

Jay's cards
6	6	6

Sam's cards
6	12
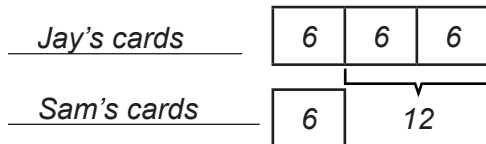
Jay has __18__ cards

and Sam has __6__ cards.

b) Vicky is 4 times as old as Ella. Vicky is 15 years older than Ella. How old are Vicky and Ella?

_____

_____

Vicky is ____ years old

and Ella is ____ years old.

c) There are 6 times as many party balloons as streamers to decorate a house. There are 42 decorations altogether. How many balloons and how many streamers are there?

There are ____ party balloons

and ____ streamers.

BONUS ▶
A pancake recipe calls for 2 tablespoons of butter and 3 times as many tablespoons of sugar per batch. Anna wants to make 24 batches. How many tablespoons of sugar and butter does she need?

Anna needs ____ tablespoons of butter and

____ tablespoons of sugar.

6. A pair of shoes costs twice as much as a wallet. Glen paid $51 for a pair of shoes and a wallet. How much does each item cost?

_____

_____

BONUS ▶ How much would Glen pay for two pairs of shoes and three wallets?

PA5-15 Problems and Equations—Multiplication and Division

When the larger part is 3 times the size of the smaller part, we say the **scale factor** is 3.

Smaller Part

Larger Part

You can find one part from another part using the scale factor.

Larger Part = Smaller Part × Scale Factor

Smaller Part = Larger Part ÷ Scale Factor

1. Circle the larger part and underline the smaller part in the problem. Then fill in the blanks for the equation where the unknown is by itself and cross out the other equation.

a) There are 21 cats and m dogs. There are three times as many dogs as cats.

$\underline{\quad m \quad}$ = $\underline{\quad 21 \quad}$ × $\underline{\quad 3 \quad}$ or
Larger Part   Smaller Part   Scale Factor

Smaller Part   Larger Part   Scale Factor

b) There are m cats and 6 dogs. There are 3 times as many dogs as cats.

_____ = _____ × _____ or _____ = _____ ÷ _____
Larger Part   Smaller Part   Scale Factor   Smaller Part   Larger Part   Scale Factor

c) There are 12 cars in a parking lot. There are twice as many vans as cars in the parking lot.

_____ = _____ × _____ or _____ = _____ ÷ _____
Larger Part   Smaller Part   Scale Factor   Smaller Part   Larger Part   Scale Factor

2. Fill in the table. Write n for the number you are not given.
Hint: Circle the larger part and underline the smaller part.

	Problem	Parts	How Many?	Equation
a)	There are 20 green apples in a box. There are 4 times as many green apples as red apples.	green apples	20	$20 \div 4 = n$
		red apples	n	
b)	There are 16 mangoes. There are twice as many mangoes as kiwis.			
c)	There are 6 cats in a shelter. There are three times as many dogs as cats in the shelter.			

3. Complete the table.

	Total Number of Things	Number of Sets	Number in Each Set	Multiplication or Division Equation
a)	p	5	2	$5 \times 2 = p$
b)	12	4	p	$12 \div 4 = p$
c)	14	p	7	
d)	p	2	11	

4. Fill in the table. Write *x* to show what you don't know. Then write a multiplication or division equation in the last column and solve the equation.

		Total Number of Things	Number of Sets	Number in Each Set	Multiplication or Division Equation
a)	24 people 4 vans	24	4	x	_____$24 \div 4 = x$_____ __6__ people in each van
b)	8 balloons in each bag 5 bags				_____ _____ balloons
c)	35 students 7 teams				_____ _____ students on each team
d)	9 books on each shelf 6 shelves				_____ _____ books
e)	6 juice boxes in each pack 48 juice boxes				_____ _____ packs of juice

5. A store sold 6 rats and twice as many hamsters.

   a) How many hamsters did the store sell?

   b) How many rats and hamsters were sold altogether?

   c) How many more hamsters than rats were sold?

6. Emma is 5 times as old as Eddy. Emma is 35.

   a) How old is Eddy?

   b) How much older than Eddy is Emma?

7. A female angler fish is 5 times as large as a male angler fish.
   The female can be 100 cm long.

   a) How long is the male angler fish?

   b) How much longer than the male is the female angler fish?

PA5-16 More Problems and Equations

1. a) There are 12 blue beads. There are 3 times as many blue beads as red beads.
There are 7 fewer yellow beads than blue beads.

   How many red beads are there? _____   How many yellow beads are there? _____

   b) Ronin is 3 times as old as Liz. Karen is four years older than Liz. Liz is 6 years old.

   How old is Ronin? _____   How old is Karen? _____

2. Zara is two years older than Tristan. Tristan is 10 years old. Tristan is 7 years older
than Carl. How old are Zara and Carl?

   Zara is _____ years old and Carl is _____ years old.

3. Ansel bought six books about mammals and two books about reptiles.
Each book cost $12.

   a) How many books did Ansel buy altogether? _____

   b) How much did the books cost? _____

4. Aputik bought 7 books and 10 magazines. (See the prices in the picture.)

   Sale!
   $12 $15
   Books Magazines

   a) How much did Aputik spend on books? _____

   b) How much did Aputik spend on magazines? _____

   c) How much did Aputik spend altogether? _____

5. What question do you need to ask and answer before you can solve the problem?

   a) Mary has twice as many hockey cards as Ren does. Mary has 10 more hockey
   cards than David. David has 16 hockey cards. How many cards does Ren have?

   How many cards does Mary have? _____

   b) Ben is twice as old as Lela. Lela is three years older than John.
   John is five years old. How old is Ben?

   _____

   c) Ryder had $53. He spent $15 on a hat, $8 on a scarf, and $12 on a pair of mitts.
   How much money does Ryder have left?

   _____

6. Tina earns $15 per hour. She worked 3 hours on Friday, 2 hours on Saturday,
and 2 hours on Sunday. How much money did Tina earn in these three days?

7. Ava used 3 times as many blue beads as red beads for a bracelet.
She used 12 more blue beads than yellow beads. She used 3 yellow beads.

   a) How many beads of each colour did Ava use?

   b) How many beads did she use in total?

8. Snow geese can fly 160 km in 2 hours. They can fly for a very long time.

   a) Some snow geese flew for 18 hours, rested, and then flew for
another 20 hours. How long did the geese travel? How far did
the geese travel?

   b) Snow geese need to fly about 3200 km from British Columbia, Canada
to Texas, USA. How much flying time do the geese need?
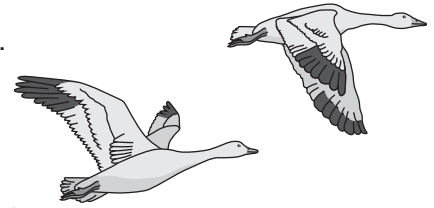
9. A narwhal is an arctic whale. The adult male has one very long tooth.
An adult narwhal is about 5 m long from nose to tail, and its tooth
is 3 m long. Use the diagram to tell how long a baby narwhal is.

adult male narwhal

baby narwhal
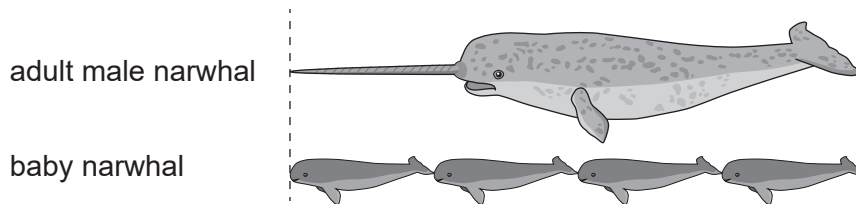
10. An eraser is 5 cm long. A pencil is 15 cm long.
Write your answer as a full sentence.

   a) How many times as long as the eraser is the pencil?

   b) How many centimetres longer is the pencil than the eraser?

11. An elephant weighs 4000 kg and is 4 m tall.
Is this elephant 1000 times as heavy as it is tall? Explain.
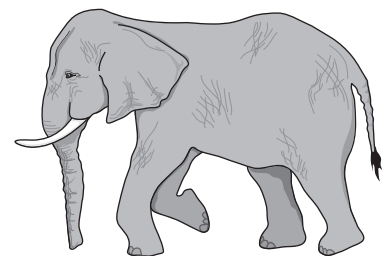
12. There are 5 people at a pizza party. They ordered 2 pizzas.
Each pizza has 8 slices. Each person gets the same number
of slices. How many slices can each person have?

13. There are 52 avocados in a crate. Thirteen are spoiled. Zack packs
the rest into bags of 5 avocados. How many full bags can he make?

14. There are 24 students in one class and 23 students in another class
going on a field trip. Each car can hold 4 students. How many cars are
needed to transport all the students?

NS5-34 Naming Fractions—Area

The whole pie is cut into 4 equal parts.

3 parts out of 4 are shaded.

$\frac{3}{4}$ of the whole pie is shaded.
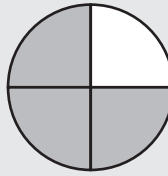
$\frac{3}{4}$

*The **numerator** (3) tells you how many parts are shaded.*

*The **denominator** (4) tells you how many equal parts are in a whole.*
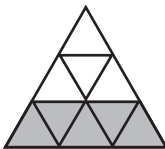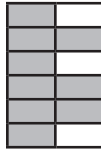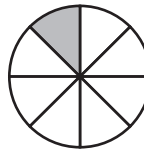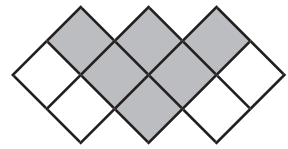
1. Name the fraction.
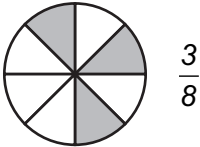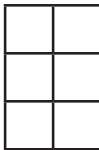
a) $\frac{3}{8}$

b)
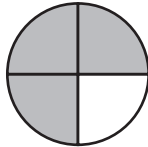
c)
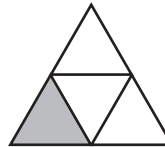
d)

e)

f)

g)

h)

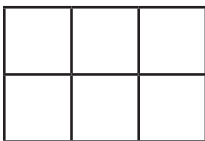**2.** Shade the given fraction.

a) $\frac{4}{6}$

b) $\frac{2}{5}$
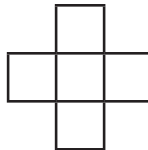
c) $\frac{7}{20}$
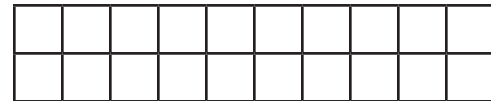
3. Use one of the following words to describe the parts in the model.

halves   thirds   fourths   fifths   sixths   sevenths   eighths   ninths

a)

_____*sixths*_____

b)

_____
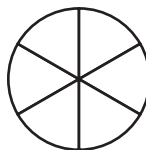
c)

_____
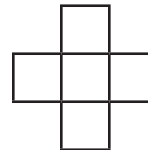
d)

_____

e)

_____
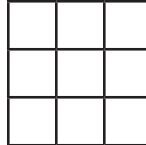
f)

_____
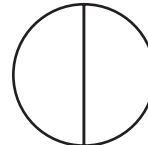
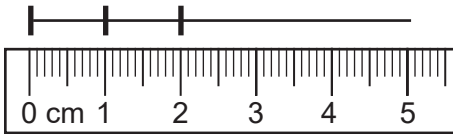**4.** Sketch a circle cut into …

a) thirds.

b) quarters (or fourths).

c) eighths.

5. Use a centimetre ruler to divide the line into equal parts. The first one is started for you.
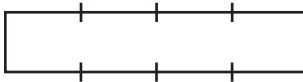
a) 5 equal parts

b) 8 equal parts

c) 6 equal parts

6. Using a ruler, join the marks to divide the box into equal parts.

a) 4 equal parts

b) 5 equal parts

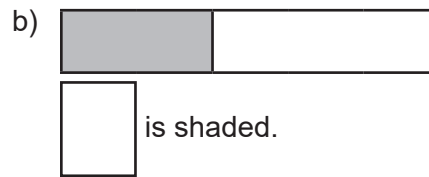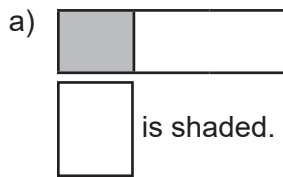**7.** Mark the box in centimetres. Then divide the box into equal parts.
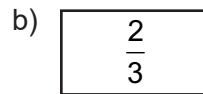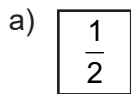
a) 3 equal parts

b) 6 equal parts

8. Using a ruler, find what fraction of the box is shaded.

a)

is shaded.

b)

is shaded.

9. Using a ruler, complete the figure to make a whole.
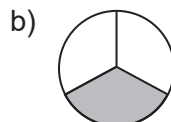
a) $\dfrac{1}{2}$

b) $\dfrac{2}{3}$

10. You have $\dfrac{3}{8}$ of a whole pie.

a) What does the bottom (denominator) of the fraction tell you?

b) What does the top (numerator) of the fraction tell you?

11. Explain why the picture does (or does not) show $\dfrac{1}{4}$.

a)

b)

c)

BONUS ▶

NS5-35 Naming Fractions—Sets

Fractions can name or describe parts of a set. Example:

$\frac{3}{5}$ of the shapes are triangles, $\frac{1}{5}$ are squares, $\frac{1}{5}$ are circles.

1. Complete the sentence.

a) $\frac{4}{7}$ of the shapes are _____.

b) $\frac{2}{7}$ of the shapes are _____.

c) $\frac{1}{7}$ of the shapes are _____.

d) $\frac{3}{7}$ of the shapes are _____.

2. Complete the sentences.

a)

$\boxed{}$ of the shapes are squares.

$\boxed{}$ of the shapes are shaded.

b)

$\boxed{}$ of the shapes are triangles.

$\boxed{}$ of the shapes are unshaded.

3. Describe the picture in two different ways using the fraction $\frac{3}{5}$.

_____

_____

4. A football team wins 6 games and loses 3 games.

a) How many games did the team play? _____

b) What fraction of the games did the team win? $\boxed{}$

c) What fraction of the games did the team lose? $\boxed{}$

d) Did the team win more than half its games? _____

5. Answer the question using the information in the table.

	Has Siblings	Has No Siblings
Class A	2	3
Class B	1	2

a) What fraction of the students in each class have siblings?

Class A ☐   Class B ☐

b) What fraction of all the students have siblings? ☐

6. What fraction of the letters in the word "Manitoba" are …

a) vowels? ☐   b) consonants? ☐

7. Express 6 days as a fraction of one week. ☐

8.

a) ☐ of the shapes are circles.   b) ☐ of the shapes are triangles.

c) ☐ of the shapes are striped.   d) ☐ of the shapes are white.

9. Write two more fraction statements for the figures in Question 8.

☐ of the shapes are _____.

☐ of the shapes are _____.

10. Draw the shaded and unshaded shapes and then answer the question.

a) There are 7 circles and squares.

$\frac{4}{7}$ of the shapes are squares.

$\frac{5}{7}$ of the shapes are shaded.

3 circles are shaded.

How many squares are shaded?

b) There are 8 triangles and squares.
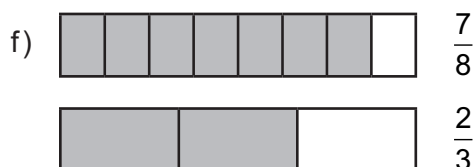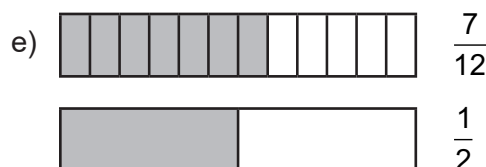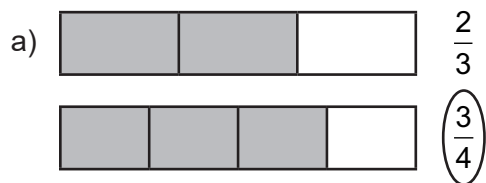
$\frac{3}{8}$ of the shapes are shaded.

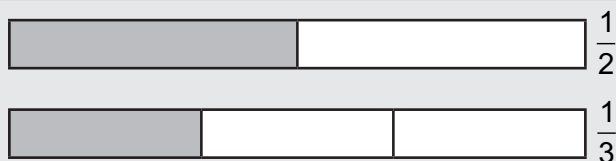$\frac{4}{8}$ of the shapes are triangles.

1 triangle is shaded.

How many squares are not shaded?
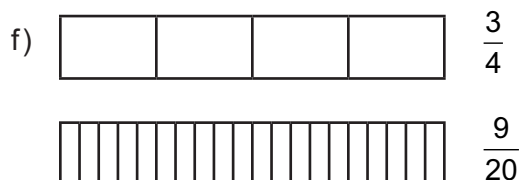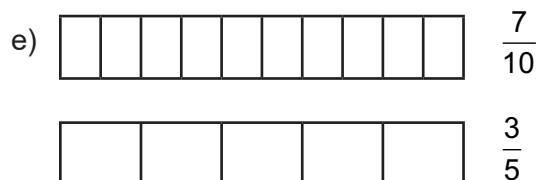
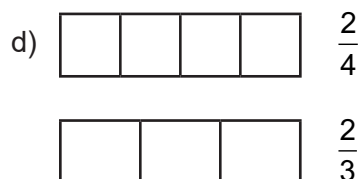# NS5-36 Comparing Fractions (Introduction)

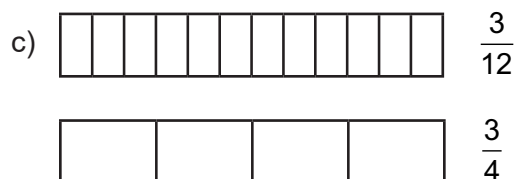**1.** Which strip has more shading? Circle its fraction.

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

$\boxed{\frac{3}{4}}$ (circled)

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

$\frac{5}{6}$

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

$\frac{1}{2}$

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

$\frac{3}{8}$

e) $\frac{7}{12}$

$\frac{1}{2}$

f) $\frac{7}{8}$

$\frac{2}{3}$

The strip with more shading represents the greater fraction. $\frac{1}{2}$ has more shading than $\frac{1}{3}$. So $\frac{1}{2}$ is **greater than** $\frac{1}{3}$.
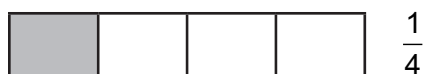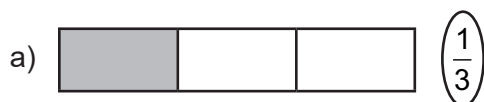
$\frac{1}{2}$

$\frac{1}{3}$

---

2. Shade the amounts given by the fractions. Circle the greater fraction.
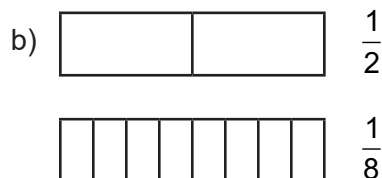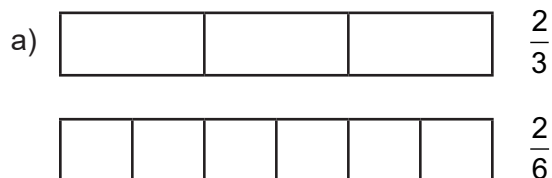
a) $\frac{2}{3}$
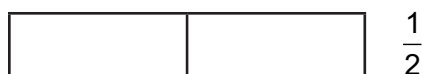
$\frac{2}{6}$

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

$\frac{1}{8}$

c) $\frac{3}{12}$

$\frac{3}{4}$

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

$\frac{2}{3}$

e) $\frac{7}{10}$

$\frac{3}{5}$

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

$\frac{9}{20}$
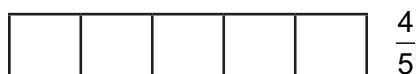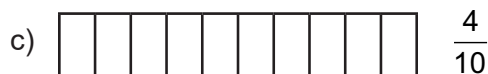
3. Shade the amounts given by the fractions. Circle the greater fraction. Write > or < between the fractions.

a)

$\dfrac{1}{3}$
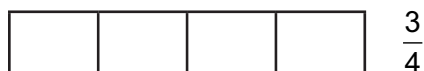
$\dfrac{1}{4}$
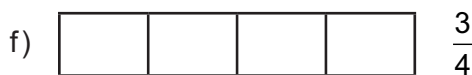
$\dfrac{1}{3}$ > $\dfrac{1}{4}$

b)

$\dfrac{3}{8}$

$\dfrac{1}{2}$

$\dfrac{3}{8}$ ☐ $\dfrac{1}{2}$

c)

$\dfrac{4}{10}$

$\dfrac{4}{5}$

$\dfrac{4}{10}$ ☐ $\dfrac{4}{5}$

d)

$\dfrac{2}{3}$

$\dfrac{3}{6}$

$\dfrac{2}{3}$ ☐ $\dfrac{3}{6}$

e)

$\dfrac{7}{12}$

$\dfrac{3}{4}$

$\dfrac{7}{12}$ ☐ $\dfrac{3}{4}$

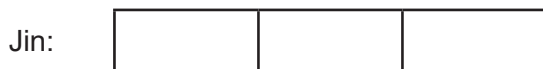f)

$\dfrac{3}{4}$

$\dfrac{16}{20}$
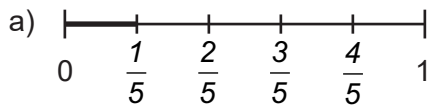
$\dfrac{3}{4}$ ☐ $\dfrac{16}{20}$

BONUS ▶ Shade the strips to show that Jin ate $\dfrac{2}{3}$ of his fruit strip, Simon ate $\dfrac{9}{12}$ of his fruit strip, and Alexa ate $\dfrac{14}{24}$ of her fruit strip. Who ate the largest amount of the fruit strip? Order the fractions from greatest to least in the blanks below.
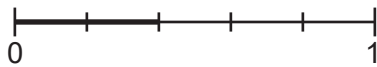
Jin:

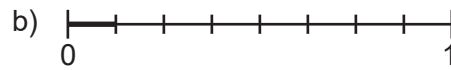Simon:

Alexa:

☐ > ☐ > ☐

NS5-37 Fractions and Number Lines

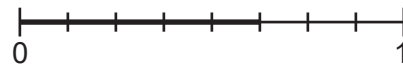1. Write a scale below the number line. Use it to find what fraction of the number line from 0 to 1 is shaded.

a)

$0 \quad \frac{1}{5} \quad \frac{2}{5} \quad \frac{3}{5} \quad \frac{4}{5} \quad 1$

$\boxed{\dfrac{1}{5}}$ is shaded.

$0 \qquad\qquad 1$

So $\boxed{}$ is shaded.

b)

$0 \qquad\qquad 1$

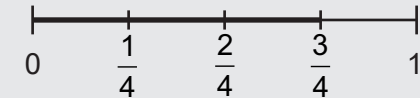$\boxed{}$ is shaded.
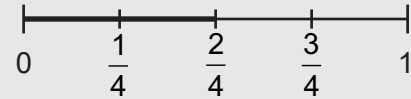
$0 \qquad\qquad 1$

So $\boxed{}$ is shaded.

You can use number lines to compare and order fractions.

$0 \quad \frac{1}{4} \quad \frac{2}{4} \quad \frac{3}{4} \quad 1$

$\dfrac{3}{4}$ is greater than $\dfrac{2}{4}$ because it is farther to the right: $\dfrac{3}{4} > \dfrac{2}{4}$.

$0 \quad \frac{1}{4} \quad \frac{2}{4} \quad \frac{3}{4} \quad 1$

---

2. Find what fraction of each number line from 0 to 1 is shaded. Then compare the fractions in the blanks below.

a)

$0 \qquad\qquad 1$ $\boxed{\dfrac{5}{8}}$

$0 \qquad\qquad 1$ $\boxed{\dfrac{3}{8}}$

$\boxed{\dfrac{5}{8}} > \boxed{}$

b)

$0 \qquad\qquad 1$ $\boxed{}$

$0 \qquad\qquad 1$ $\boxed{}$

$\boxed{} > \boxed{}$
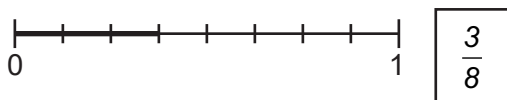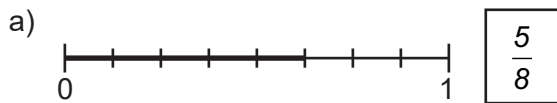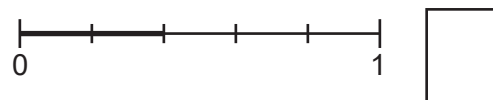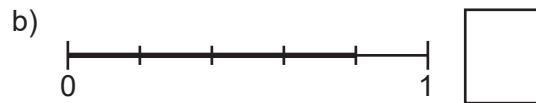
3. Use the number line to order the fractions from least to greatest.

Draw an ✗ to mark the position of each fraction.

$\dfrac{0}{10} \quad \dfrac{1}{10} \quad \dfrac{2}{10} \quad \dfrac{3}{10} \quad \dfrac{4}{10} \quad \dfrac{5}{10} \quad \dfrac{6}{10} \quad \dfrac{7}{10} \quad \dfrac{8}{10} \quad \dfrac{9}{10} \quad \dfrac{10}{10}$
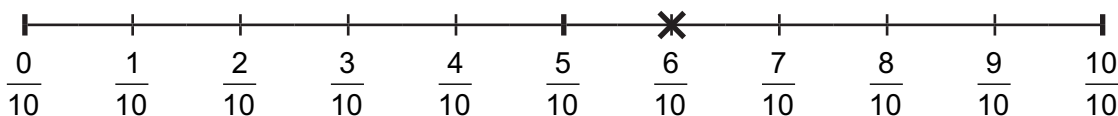
$\dfrac{6}{10} \quad \dfrac{3}{10} \quad \dfrac{8}{10} \quad \dfrac{4}{10} \quad \dfrac{1}{10} \quad \dfrac{9}{10} \quad \dfrac{7}{10}$

$\boxed{} < \boxed{} < \boxed{} < \boxed{} < \boxed{} < \boxed{} < \boxed{}$

4. $\frac{3}{4}$ of the top strip is shaded and $\frac{2}{3}$ of the bottom strip is shaded. Both lengths are marked on the same number line.
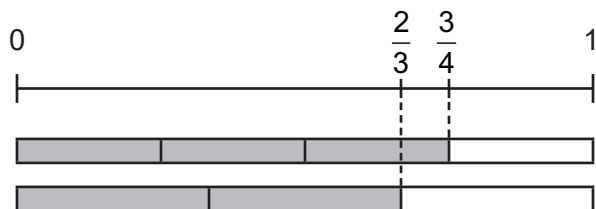
Which fraction is bigger? [　]

5. Use the fractions marked on the number line to answer the question.
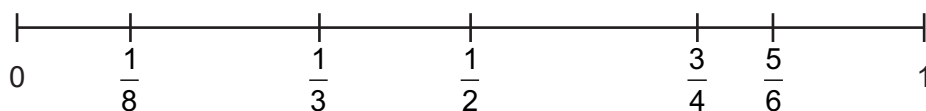
a) Write $<$ (less than) or $>$ (greater than).

i) $\frac{1}{8}$ [　] $\frac{1}{2}$ ii) $\frac{3}{4}$ [　] $\frac{1}{3}$ iii) $\frac{5}{6}$ [　] $\frac{3}{4}$

b) Circle these fractions on the number line above. Then write them from greatest to least.

$\frac{1}{2}, \frac{5}{6}, \frac{1}{3}$ [　] $>$ [　] $>$ [　]

c) You can see from the number line that $\frac{1}{8}$ is less than $\frac{1}{3}$, which is less than $\frac{1}{2}$.

Explain why the fraction with the largest denominator is the smallest of the three fractions. Explain why the fraction with the smallest denominator is the largest of the three fractions.

Two fractions that mark the same place on a number line from 0 to 1 represent the same amount.

6. Use the number lines to find the missing number.
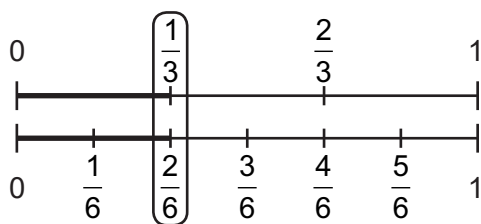
a) $\frac{1}{3} = \frac{2}{6}$ b) $\frac{2}{3} = \frac{}{6}$ c) $\frac{1}{4} = \frac{}{8}$ d) $\frac{3}{4} = \frac{}{8}$

NS5-38 Comparing and Ordering Fractions

1. a) Write the numerators of the shaded fractions.
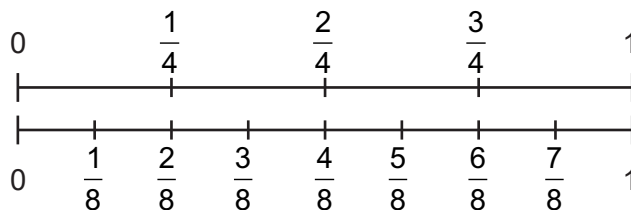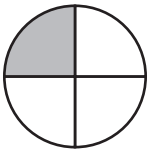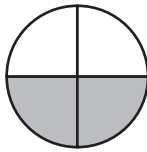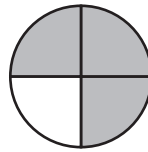
$\dfrac{}{4}$ $\qquad\qquad$ $\dfrac{}{4}$ $\qquad\qquad$ $\dfrac{}{4}$

b) Look at the pictures and fractions in part a) from left to right.
Write "increases," "decreases," or "stays the same."

   i) The numerator _____.

   ii) The denominator _____.

   iii) The shaded fraction _____.

Comparing fractions when ...

the numerator changes $\qquad$ **and** $\qquad$ **the denominator stays the same**

$\dfrac{1}{5}$

fewer shaded parts ➝ ▢▢▢▢▢ ⬅ same number and size of parts

more shaded parts ➝ ▢▢▢▢▢ ⬅

$\dfrac{2}{5}$

So $\dfrac{2}{5} > \dfrac{1}{5}$ because more parts are shaded.

---

2. Circle the greater fraction.

   a) $\dfrac{3}{5}$ or $\dfrac{4}{5}$ $\qquad\qquad$ b) $\dfrac{3}{4}$ or $\dfrac{1}{4}$ $\qquad\qquad$ c) $\dfrac{4}{12}$ or $\dfrac{9}{12}$ $\qquad\qquad$ d) $\dfrac{3}{3}$ or $\dfrac{1}{3}$

3. Write any number in the blank that makes the relationship correct.

   a) $\dfrac{3}{7} > \dfrac{1}{7}$ $\qquad\qquad$ b) $\dfrac{}{29} < \dfrac{21}{29}$ $\qquad\qquad$ c) $\dfrac{61}{385} > \dfrac{}{385}$ $\qquad\qquad$ **BONUS** ▶ $\dfrac{}{1000} < \dfrac{2}{1000}$

4. Two fractions have the same denominator but different numerators.
How can you tell which fraction is greater?

_____

_____

5. Order the fractions from least to greatest by considering the numerators and denominators.
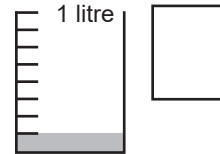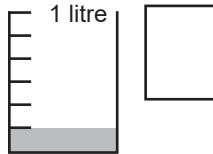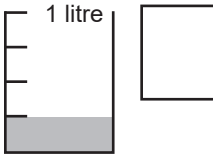
a) $\dfrac{3}{5}$ $\dfrac{0}{5}$ $\dfrac{2}{5}$ $\dfrac{5}{5}$ $\dfrac{1}{5}$

b) $\dfrac{6}{10}$ $\dfrac{1}{10}$ $\dfrac{4}{10}$ $\dfrac{2}{10}$ $\dfrac{9}{10}$

☐ < ☐ < ☐ < ☐ < ☐   ☐ < ☐ < ☐ < ☐ < ☐

6. a) What fraction of a litre is in the container?

1 litre ☐   1 litre ☐   1 litre ☐

b) Which fraction in part a) is …

i) the smallest? ☐   ii) the biggest? ☐   iii) in the middle? ☐

c) Write "smaller" or "bigger." As the denominator gets bigger, each part gets _____.

Comparing fractions when ...

the numerator stays the same   **and**   **the denominator changes**

$\dfrac{1}{5}$

same number of shaded parts →   ← smaller parts
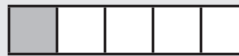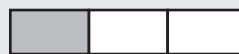
← bigger parts

$\dfrac{1}{3}$

So $\dfrac{1}{5} < \dfrac{1}{3}$ because the parts are smaller in the shape with more parts.

---

7. Circle the greater fraction.

a) $\dfrac{4}{5}$ or $\dfrac{4}{8}$ b) $\dfrac{3}{4}$ or $\dfrac{3}{5}$ c) $\dfrac{9}{15}$ or $\dfrac{9}{100}$ d) $\dfrac{3}{4}$ or $\dfrac{3}{3}$

8. Two fractions have the same numerator but different denominators.
How can you tell which fraction is greater?

_____

_____

Number Sense 5-38

9. a) Order the fractions from least to greatest by matching each fraction to the strip
   it represents and then shading it.

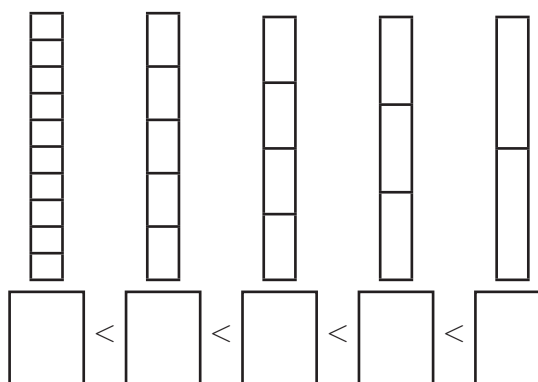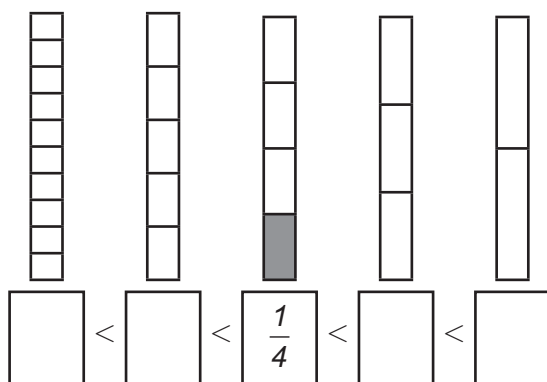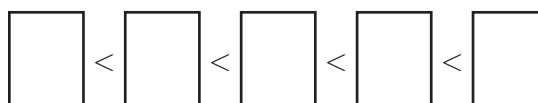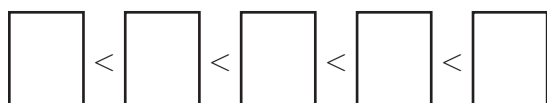   i) $\dfrac{1}{4}$ $\dfrac{1}{10}$ $\dfrac{1}{2}$ $\dfrac{1}{5}$ $\dfrac{1}{3}$ ii) $\dfrac{2}{2}$ $\dfrac{2}{4}$ $\dfrac{2}{10}$ $\dfrac{2}{3}$ $\dfrac{2}{5}$

   ☐ < ☐ < $\dfrac{1}{4}$ < ☐ < ☐   ☐ < ☐ < ☐ < ☐ < ☐

   b) Order the fractions from least to greatest by considering the numerators and denominators.

   i) $\dfrac{1}{4}$ $\dfrac{1}{10}$ $\dfrac{1}{2}$ $\dfrac{1}{5}$ $\dfrac{1}{3}$ ii) $\dfrac{2}{2}$ $\dfrac{2}{4}$ $\dfrac{2}{10}$ $\dfrac{2}{3}$ $\dfrac{2}{5}$

   ☐ < ☐ < ☐ < ☐ < ☐   ☐ < ☐ < ☐ < ☐ < ☐

   c) Are your answers for parts a) and b) the same? Explain.

   _____

   _____

10. Randi says that $\dfrac{1}{4}$ of a pie is less than $\dfrac{1}{6}$ of a pie. Is she correct? Explain.

   _____

   _____
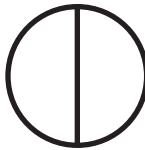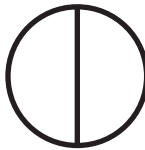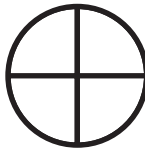
11. Ray, Hanna, and Lynn each brought 1 pie to school. None of the pies are the same size.
   The teacher cut each pie into 9 equal pieces so that everyone in the class can have
   a piece. Ray says, "That's not fair at all!" and Lynn says, "That's perfectly fair!"

   a) Why does Ray think it's unfair?

   _____

   _____

   b) Why does Lynn think it's fair?

   _____

   _____

NS5-39 Equivalent Fractions

1. How many times as many parts are there?

a)   has _____ times as many parts as .

b)   has _____ times as many parts as .

c)   has _____ times as many parts as .

d)   has _____ times as many parts as .

2. Fill in the blanks.

a) A has _____ times as many parts as B.

   A has _____ times as many shaded parts as B.
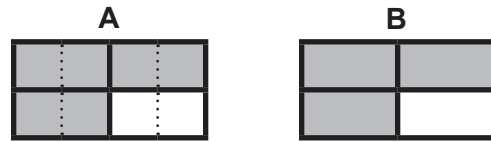
b) A has _____ times as many parts as B.

   A has _____ times as many shaded parts as B.

c) A has _____ times as many parts as B.

   A has _____ times as many shaded parts as B.

d) A has _____ times as many parts as B.

   A has _____ times as many shaded parts as B.

CA 5.2 AP U9 NS34-45 p20-44 V5.indd   31   2019-09-13   1:54:36 PM
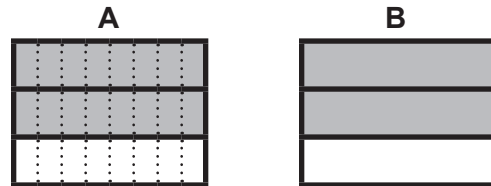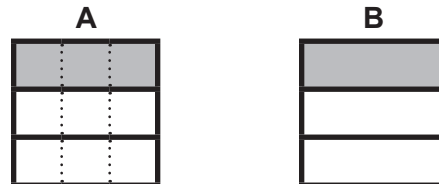
> **Equivalent fractions** are fractions that have the same value or represent the same amount.

3. The picture shows two equivalent fractions. Use the picture to fill in the blanks.

a)

$\dfrac{3}{5}$ and $\dfrac{6}{10}$

6 is __2__ times as much as 3.

10 is _____ times as much as 5.

b)

$\dfrac{4}{5}$ and $\dfrac{12}{15}$
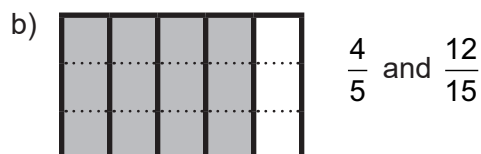
12 is _____ times as much as 4.

15 is _____ times as much as 5.

c)

$\dfrac{1}{4}$ and $\dfrac{2}{8}$
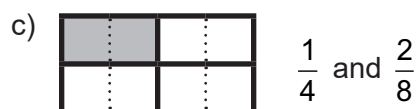
2 is _____ times as much as 1.

8 is _____ times as much as 4.

d)

$\dfrac{3}{5}$ and $\dfrac{12}{20}$
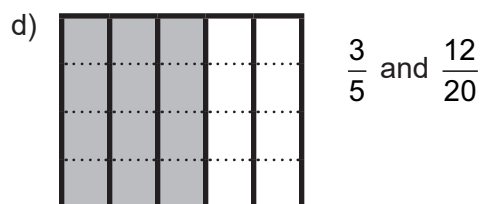
12 is _____ times as much as 3.

20 is _____ times as much as 5.

4. Write an equivalent fraction for the picture. Then write how many times as much the new numerator and denominator are.

a)

$\dfrac{2}{4} = \boxed{\dfrac{6}{12}}$

__3__ times as much

b)

$\dfrac{1}{4} = \boxed{}$

_____ times as much

c)

$\dfrac{3}{5} = \boxed{}$
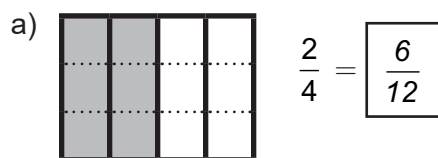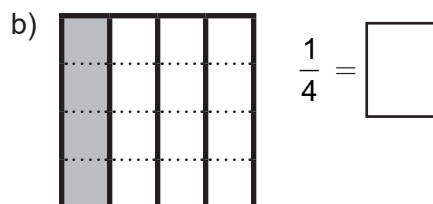
_____ times as much

BONUS ▶

$\dfrac{7}{10} = \boxed{}$

_____ times as much

To get an equivalent fraction, multiply the numerator **and** denominator by the same number.

Example: Picture A   Picture B

$$\frac{3}{4} \xrightarrow[\times 2]{\times 2} \frac{6}{8}$$

Picture B has twice as many **parts** as Picture A.
Picture B has twice as many **shaded parts** as Picture A.

5. Draw lines to cut the whole pies into more equal pieces. Fill in the numerators of the equivalent fractions.

a)
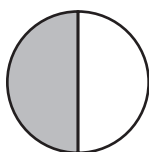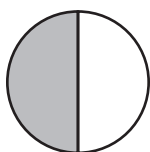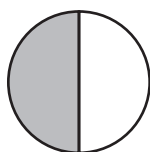
4 pieces   6 pieces   8 pieces

$$\frac{1}{2} = \frac{}{4} = \frac{}{6} = \frac{}{8}$$

b)
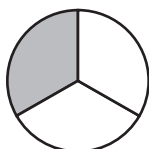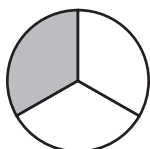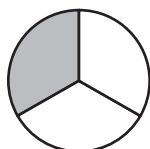
6 pieces   9 pieces   12 pieces

$$\frac{1}{3} = \frac{}{6} = \frac{}{9} = \frac{}{12}$$

6. Draw lines to cut the whole pie into more pieces. Then fill in the missing numbers.

a)
$$\frac{2}{3} \xrightarrow[\times 2]{\times 2} \frac{}{6}$$

b)
$$\frac{3}{4} \xrightarrow[\times]{\times} \frac{}{8}$$

c)
$$\frac{2}{3} \xrightarrow[\times]{\times} \frac{}{9}$$
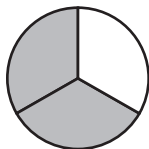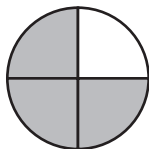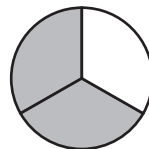
This number tells you how many pieces to cut each slice into.

7. Use multiplication to find the equivalent fraction.

a) $\dfrac{1 \times 2}{5 \times 2} = \dfrac{}{10}$

b) $\dfrac{1 \times}{2 \times} = \dfrac{}{10}$

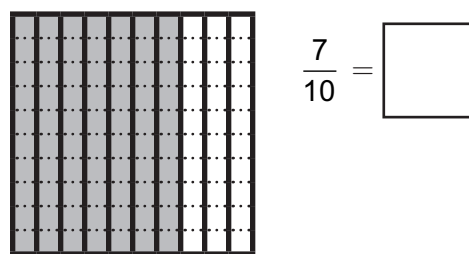c) $\dfrac{2}{5} = \dfrac{}{10}$

d) $\dfrac{3}{4} = \dfrac{}{8}$

e) $\dfrac{1}{4} = \dfrac{}{12}$

f) $\dfrac{4}{5} = \dfrac{}{15}$

g) $\dfrac{5}{6} = \dfrac{}{12}$

h) $\dfrac{8}{10} = \dfrac{}{100}$

i) $\dfrac{5}{9} = \dfrac{}{72}$

8. Write five fractions equivalent to $\dfrac{2}{5}$.

$$\frac{2}{5} = \boxed{} = \boxed{} = \boxed{} = \boxed{} = \boxed{}$$

1. Draw lines to cut the whole pies into more equal pieces. Then fill in the numerators of the equivalent fractions.

a)
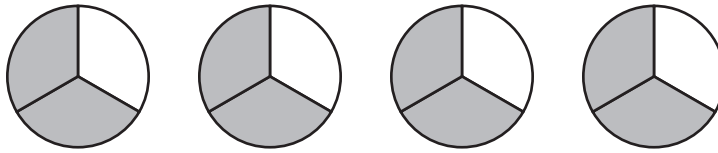
$$\frac{2}{3} = \frac{}{6} = \frac{}{9} = \frac{}{12} = \frac{}{15}$$

b)
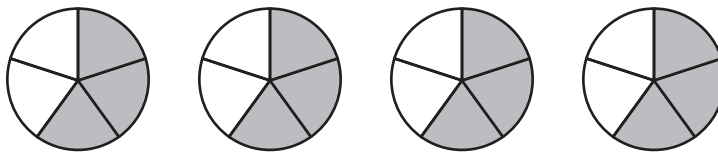
$$\frac{3}{5} = \frac{}{10} = \frac{}{15} = \frac{}{20} = \frac{}{25}$$

**2.** a) Write two fractions with the same denominator. Hint: Use your answers from Question 1.

$$\frac{2}{3} = \boxed{} \text{ and } \frac{3}{5} = \boxed{}$$

b) Which of the two fractions is greater, $\frac{2}{3}$ or $\frac{3}{5}$? $\boxed{}$

How do you know? _____

_____

3. Rewrite the fractions so that they have the same denominator. Then circle the larger fraction.

a) $\frac{1}{3} = \frac{}{15}$ and $\frac{2}{5} = \frac{}{15}$

b) $\frac{3}{8} = \frac{}{24}$ and $\frac{1}{3} = \frac{}{24}$

4. a) Write an equivalent fraction with denominator 24.

i) $\frac{2}{3} = \frac{}{24}$

ii) $\frac{5}{6} = \frac{}{24}$

iii) $\frac{3}{4} = \frac{}{24}$

iv) $\frac{1}{2} = \frac{}{24}$

b) Write the fractions from part a) in order from least to greatest.

$$\boxed{} < \boxed{} < \boxed{} < \boxed{}$$

5. Draw lines to cut the left-hand pie into the same number of equal pieces as the right-hand pie. Complete the equivalent fraction. Then circle the greater fraction.

a)
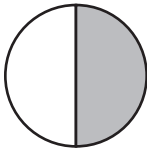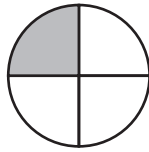
$$\frac{1}{2} = \frac{}{4} \qquad \frac{1}{4}$$

b)
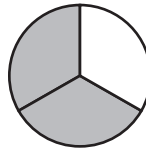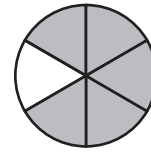
$$\frac{2}{3} = \frac{}{6} \qquad \frac{5}{6}$$

6. Turn the fraction on the left into an equivalent fraction with the same denominator as the fraction on the right. Then write < (less than) or > (greater than) to show which fraction is greater.

a) $\dfrac{1 \times 3}{2 \times 3} = \dfrac{3}{6} \; \square \; \dfrac{4}{6}$

b) $\dfrac{3 \times}{4 \times} = \dfrac{}{8} \; \square \; \dfrac{5}{8}$

c) $\dfrac{1}{2} = \dfrac{}{} \square \; \dfrac{3}{4}$

d) $\dfrac{1}{3} = \dfrac{}{} \square \; \dfrac{2}{9}$

e) $\dfrac{3}{5} = \dfrac{}{} \square \; \dfrac{7}{10}$

BONUS ▶ $\dfrac{2}{5} = \dfrac{}{} \square \; \dfrac{17}{40}$

To compare $\dfrac{1}{3}$ and $\dfrac{2}{5}$ you can change them into fractions with the same denominator.

Multiply the numerator and denominator of each fraction by the denominator of the other fraction.

$$\dfrac{1 \times 5}{3 \times 5} \qquad \dfrac{2 \times 3}{5 \times 3}$$

$$= \dfrac{5}{15} \qquad = \dfrac{6}{15}$$

Now the fractions are easy to compare: $\dfrac{5}{15} < \dfrac{6}{15}$, so $\dfrac{1}{3} < \dfrac{2}{5}$.

---

7. Turn the fractions into fractions with the same denominator. Then compare the fractions. Show your answer using < or >.

a) $\dfrac{7 \times 3}{7 \times 4} \qquad \dfrac{5 \times 4}{7 \times 4}$

$= \dfrac{}{28} \qquad = \dfrac{}{28}$

so $\dfrac{3}{4} \; \square \; \dfrac{5}{7}$

b) $\dfrac{\times 1}{\times 2} \qquad \dfrac{2 \times}{3 \times}$

$= \dfrac{}{} \qquad = \dfrac{}{}$

so $\dfrac{1}{2} \; \square \; \dfrac{2}{3}$

c) $\dfrac{\times 1}{\times 2} \qquad \dfrac{3 \times}{4 \times}$

$= \dfrac{}{} \qquad = \dfrac{}{}$

so $\dfrac{1}{2} \; \square \; \dfrac{3}{4}$

d) $\dfrac{\times 2}{\times 3} \qquad \dfrac{5 \times}{8 \times}$

$= \dfrac{}{} \qquad = \dfrac{}{}$

so $\dfrac{2}{3} \; \square \; \dfrac{5}{8}$

8. Draw a picture to justify your answer to Question 7.c).

A **tenth** (or $\frac{1}{10}$) can be represented in different ways.

0   1
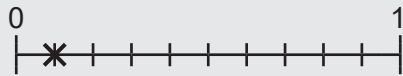
*A tenth of the distance
between 0 and 1*
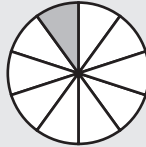
A tenth of a pie
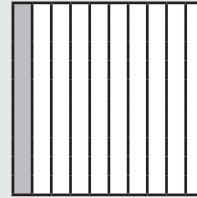
*A tenth of
hundreds block*

*A tenth of
tens block*

Tenths commonly appear in units of measurement. Example: a millimetre is a tenth of a centimetre

Mathematicians invented decimal tenths as a short form for tenths: $\frac{1}{10} = 0.1$, $\frac{2}{10} = 0.2$, and so on.

1. Write a fraction and a decimal for the shaded part in the boxes below.

a) $\frac{4}{10}$ *0.4*

b)

c)

d)
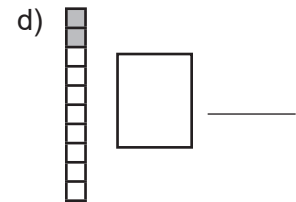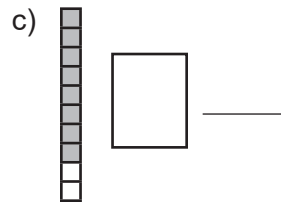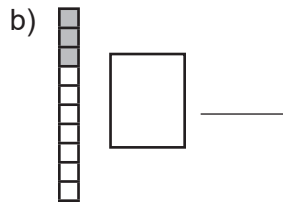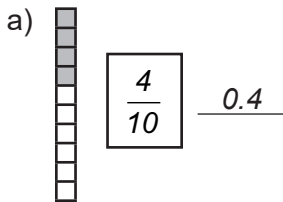
2. Write the decimal.

a) 5 tenths = ___*0.5*___

b) 4 tenths = _____

c) 6 tenths = _____

d) 9 tenths = _____

3. Shade to show the decimal.

a) 0.3

b) 0.8

c) 0.1

d) 0.4
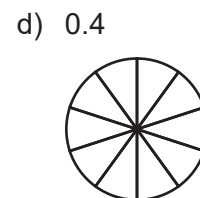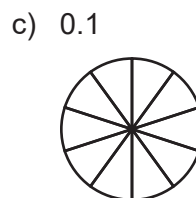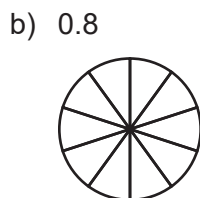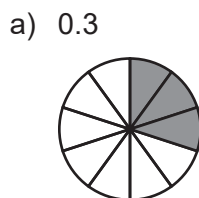
4. Show the decimal on the number line.

a) 0.8 of the distance from 0 to 1

0   1

b) 0.2 of the distance from 0 to 1

0   1

c) 0.5 of the distance from 0 to 1

0   1

d) 0.7 of the distance from 0 to 1

0   1
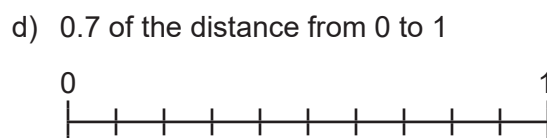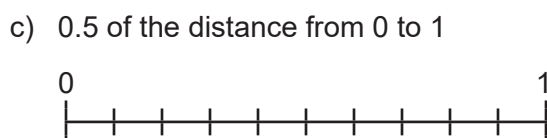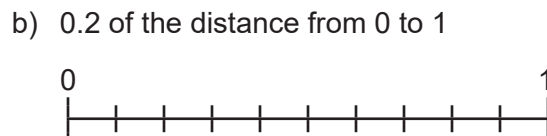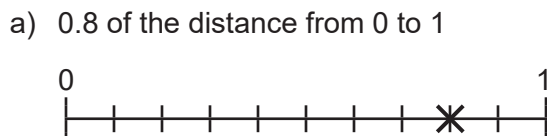
A **hundredth** (or $\frac{1}{100}$) can be represented in different ways.
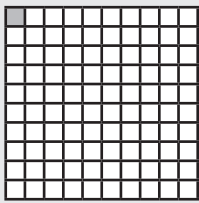
A hundredth of a hundreds block

0 ⟶ 1

A hundredth of the distance from 0 to 1

Mathematicians invented decimal hundredths as a short form for hundredths.

Examples: $\frac{1}{100} = 0.01$, $\frac{8}{100} = 0.08$, $\frac{37}{100} = 0.37$

5. Write a fraction for the shaded part of the hundreds block. Then write the fraction as a decimal.
Hint: Count by 10s for each column or row that is shaded.

a)

$\frac{67}{100} = 0.67$

b)

c)

d)

e)

BONUS ▶
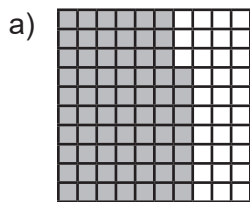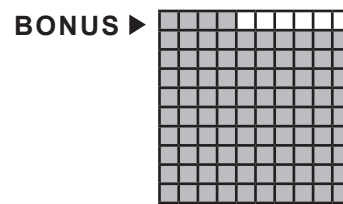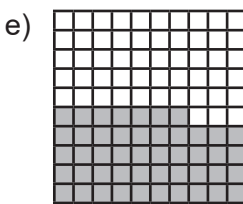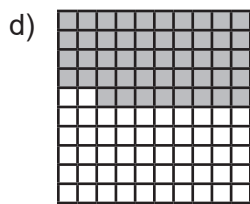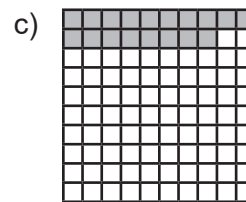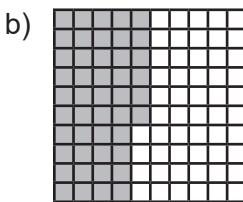
6. Write the decimal.

a) 18 hundredths = _____

b) 9 hundredths = _____

c) 90 hundredths = _____

REMINDER ▶ Points farther to the right on a number line represent greater numbers.

Example: 5 is to the right of 3 because $5 > 3$.

0 1 2 3 4 5 6 7 8 9 10

7. a) Show the decimals on the number line.

A. 0.24   **B.** 0.70   **C.** 0.06   **D.** 0.45

A

0   0.10   0.20   0.30   0.40   0.50   0.60   0.70   0.80   0.90   1.00
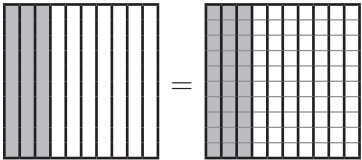
b) Write the decimals in part a) from least to greatest.

_____ < _____ < _____ < _____

1. Shade the same amount in the second square. Then count by 10s to find the number of hundredths. Write your answer as a fraction and a decimal.
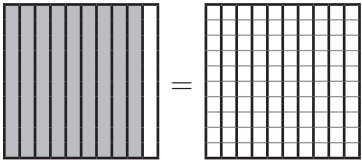
a)

$$\frac{3}{10} = \frac{30}{100}$$

$$0.3 = \underline{0.30}$$

b)

$$\frac{9}{10} = \frac{}{100}$$

$$0.9 = \underline{}$$

c)

$$\frac{6}{10} = \frac{}{100}$$

$$0.6 = \underline{}$$
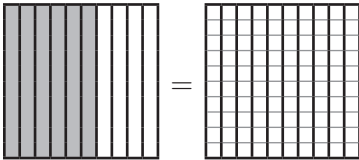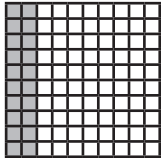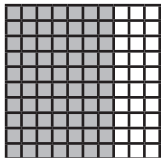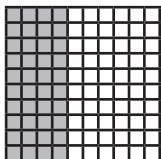
2. a) Complete the table.

	Fraction Tenths	Fraction Hundredths	Picture	Decimal Tenths	Decimal Hundredths
i)	$\frac{2}{10}$	$\frac{20}{100}$		0.2	0.20
ii)					
iii)					

b) Use part a) to write the decimals from least to greatest: 0.40   0.2   0.7

   _____ < _____ < _____

3. Write how many tenths and how many hundredths. Then write an equation with decimals.

A. _____ tenths

= _____ hundredths

So _____ = _____

B. _____ tenths

= _____ hundredths

So _____ = _____

C. _____ tenths

= _____ hundredths

So _____ = _____

4. Show the decimals on the number line. Then write the decimals from least to greatest.

a) **A.** 0.40   **B.** 0.05   **C.** 0.27

```
      A
      *
├┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┤
0       0.10    0.20    0.30    0.40    0.50    0.60    0.70    0.80    0.90    1.00
```

_____ < _____ < _____

b) **A.** 0.80   **B.** 0.08   **C.** 0.05

```
├┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┤
0       0.10    0.20    0.30    0.40    0.50    0.60    0.70    0.80    0.90    1.00
```

_____ < _____ < _____
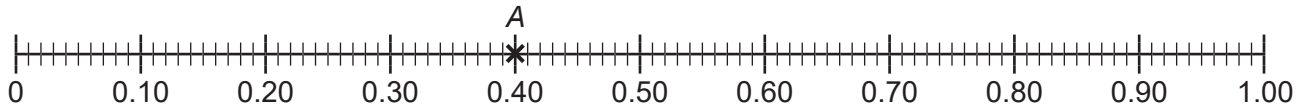
5. Write the decimal as a fraction with denominator 100.

a) $0.7 = \dfrac{}{10} = \dfrac{}{100}$

b) $0.48 = \dfrac{}{100}$

c) $0.09 = \dfrac{}{100}$

d) $0.3 = \boxed{}$

6. Write the fraction as a decimal with 2 digits after the decimal point.

a) $\dfrac{6}{10} = 0.\underline{}$
$ = 0.\underline{}\,\underline{}$

b) $\dfrac{77}{100} = 0.\underline{}\,\underline{}$

c) $\dfrac{5}{10} = 0.\underline{}$
$ = 0.\underline{}\,\underline{}$

d) $\dfrac{9}{100} = 0.\underline{}\,\underline{}$

7. Cross out the equalities that are incorrect.

$0.52 = \dfrac{52}{100}$ $0.8 = \dfrac{8}{10}$ $\dfrac{17}{100} = 0.17$ $\dfrac{3}{100} = 0.03$

$0.7 = \dfrac{7}{100}$ $0.53 = \dfrac{53}{100}$ $0.05 = \dfrac{5}{100}$ $0.02 = \dfrac{2}{10}$

8. Write the decimals as hundredths to compare the decimals. Then write $<$ or $>$ in the box.

a) 0.4   0.73

$= \dfrac{}{100}$ $= \dfrac{}{100}$

0.4 $\boxed{}$ 0.73

b) 0.2   0.16

$= \dfrac{}{}$ $= \dfrac{}{}$

0.2 $\boxed{}$ 0.16

c) 0.7   0.59

$= \dfrac{}{}$ $= \dfrac{}{}$

0.7 $\boxed{}$ 0.59

NS5-48 Combining Tenths and Hundredths

1. Describe the shaded part of the hundreds block in four ways.

a)
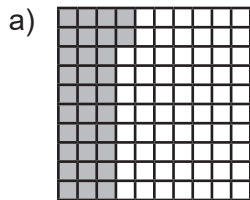
_32_ hundredths = _3_ tenths _2_ hundredths

$$\frac{32}{100} = 0.\underline{3}\ \underline{2}$$
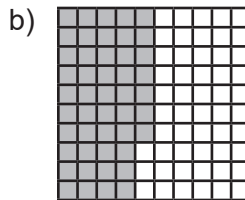
b)

____ hundredths = ___ tenths ___ hundredths

$$\frac{}{100} = 0.\underline{}\ \underline{}$$

c)

____ hundredths = ___ tenths ___ hundredths

$$\frac{}{100} = 0.\underline{}\ \underline{}$$

d)
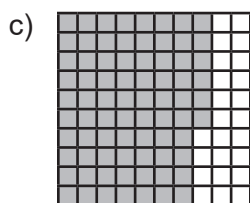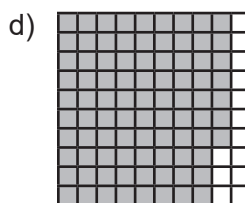
____ hundredths = ___ tenths ___ hundredths

$$\frac{}{100} = 0.\underline{}\ \underline{}$$

2. Fill in the blanks.

a) 71 hundredths = _7_ tenths _1_ hundredth

$$\frac{71}{100} = 0.\underline{7}\ \underline{1}$$

b) 28 hundredths = ____ tenths ____ hundredths

$$\frac{}{100} = 0.\underline{}\ \underline{}$$

c) 41 hundredths = ___ tenths ___ hundredth

$$\frac{}{100} = 0.\underline{}\ \underline{}$$

d) 60 hundredths = ___ tenths ___ hundredths

$$\frac{}{100} = 0.\underline{}\ \underline{}$$

e) 6 hundredths = ___ tenths ___ hundredths

$$\frac{}{100} = 0.\underline{}\ \underline{}$$

f) 95 hundredths = ___ tenths ___ hundredths

$$\frac{}{100} = 0.\underline{}\ \underline{}$$

3. Describe the decimal in two ways.

a) 0.52 = _5_ tenths _2_ hundredths

= ___52 hundredths___

b) 0.11 = ___ tenth ___ hundredth

= _____

c) 0.70 = ___ tenths ___ hundredths

= _____

d) 0.07 = ___ tenths ___ hundredths

= _____

Jasmin describes the distance covered on a number line in two ways.

43 hundredths = 4 tenths 3 hundredths

0.43

| 0 | 0.10 | 0.20 | 0.30 | 0.40 | 0.50 | 0.60 | 0.70 | 0.80 | 0.90 | 1.00 |
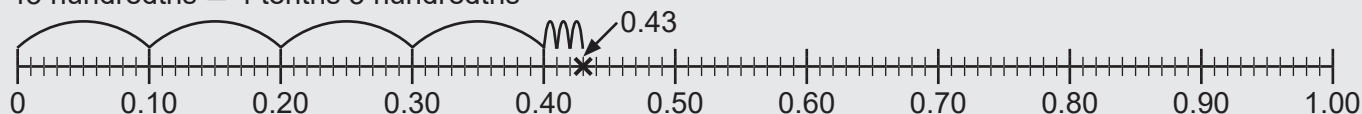
4. Write the distance covered in two ways.

A   **B**

| 0 | 0.10 | 0.20 | 0.30 | 0.40 | 0.50 | 0.60 | 0.70 | 0.80 | 0.90 | 1.0 |

A. _____ tenths _____ hundredths   **B.** _____ tenths _____ hundredths

  = _____ hundredths   = _____ hundredths

5. Estimate and mark the location of the decimals on the number line.

a) **A.** 0.62   **B.** 0.35   **C.** 0.99   **D.** 0.05

| 0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |

b) **A.** 0.37   **B.** 0.28   **C.** 0.51   **D.** 0.11

| 0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
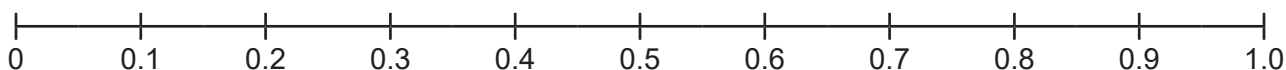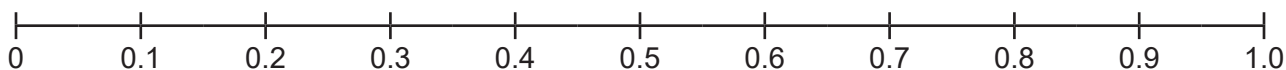
REMINDER ▶ A metre is 100 centimetres.

6. What part of a metre is the length shown? Write your answer as a decimal and a fraction.

a)

| 0 cm | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

83 cm = ___0.83___ m = $\dfrac{83}{100}$ m

b)

| 0 cm | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
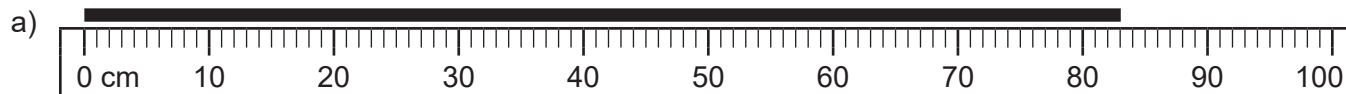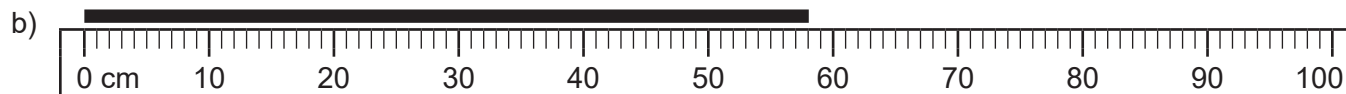
58 cm = _____ m = ☐ m

NS5-50 Decimal Fractions and Place Value

Decimals are a way to record place values based on decimal fractions.

decimal point

5 thousands → **5342.67** ← 7 hundredths

3 hundreds   4 tens   2 ones   6 tenths
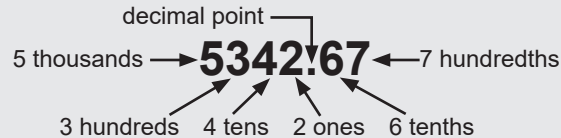
1. Write the place value of the underlined digit.

   a) 2.7   ___ones___   b) 53.9 _____   c) 107.1 _____

   d) 236.4 _____   e) 501.08 _____   f) 734.58 _____

2. Write the place value of the digit 3 in the number. Hint: First underline the 3 in the number.

   a) 261.93 _____   b) 405.03 _____   c) 7103.8 _____

   d) 3.02 _____   e) 3919.1 _____   f) 2854.30 _____

You can also write numbers using a place value chart. Example:

This is the number 7102.85 in a place value chart:

Thousands	Hundreds	Tens	Ones	Tenths	Hundredths
7	1	0	2	8	5

3. Write the number into the place value chart.

		Thousands	Hundreds	Tens	Ones	Tenths	Hundredths
a)	5227.60	5	2	2	7	6	0
b)	853.4						
c)	0.05						
d)	27.00						
e)	4.58						

4. What is the value of the digit 9 in each decimal? Write the answer two ways.

   a) 0.49 $\frac{9}{100}$ or 9 ___hundredths___   b) 3.92 $\frac{9}{}$ or 9 _____

   c) 8.90 $\frac{9}{}$ or 9 _____   d) 3.09 $\frac{9}{}$ or 9 _____

5. Put a decimal point in the number so that the digit 4 has the value $\frac{4}{10}$.

   a) 6 4 1   b) 1 0 4   c) 1 3 4 2   **BONUS** ▶ 1 0 0 0 1 4

NS5-51 Thousandths

	1 one	1 tenth	1 hundredth	1 thousandth
	$\frac{1}{1} = 1$	$\frac{1}{10} = 0.1$	$\frac{1}{100} = 0.01$	$\frac{1}{1000} = 0.001$

1. Complete the table.

	Fraction Tenths	Fraction Hundredths	Fraction Thousandths	Decimal Tenths	Decimal Hundredths	Decimal Thousandths
a)	$\frac{6}{10}$	$\frac{60}{100}$	$\frac{600}{1000}$	0.6	0.60	0.600
b)				0.3		
c)		$\frac{80}{100}$				
d)						0.500
e)	$\frac{4}{10}$					
f)			$\frac{200}{1000}$			
g)					0.70	

2. Write the fraction as a decimal with three digits after the decimal point.

a) $\frac{2}{10} = \underline{0} . \underline{2} \ \underline{0} \ \underline{0}$

b) $\frac{74}{100} = \underline{}.\underline{} \ \underline{} \ \underline{}$

c) $\frac{9}{1000} = \underline{}.\underline{} \ \underline{} \ \underline{}$

d) $\frac{101}{1000} = \underline{}.\underline{} \ \underline{} \ \underline{}$

e) $\frac{596}{1000} = \underline{}.\underline{} \ \underline{} \ \underline{}$

f) $\frac{110}{1000} = \underline{}.\underline{} \ \underline{} \ \underline{}$

g) $\frac{9}{10} = \underline{}.\underline{} \ \underline{} \ \underline{}$

h) $\frac{1}{100} = \underline{}.\underline{} \ \underline{} \ \underline{}$

i) $\frac{10}{100} = \underline{}.\underline{} \ \underline{} \ \underline{}$

3. Write the decimal as a fraction with denominator 1000.

a) $0.346 = \frac{}{1000}$

b) $0.27 = \frac{}{1000}$

c) $0.8 = \frac{}{1000}$

d) $0.101 = \frac{}{1000}$

e) $0.05 = \frac{}{1000}$

f) $0.003 = \frac{}{1000}$

g) $0.704 = \frac{}{1000}$

h) $0.060 = \frac{}{1000}$

This number line is divided into tenths. Point A is at $\frac{6}{10} = 0.6$

| | | | | | | A | | | | |
|0|0.1|0.2|0.3|0.4|0.5|0.6|0.7|0.8|0.9|1.0|
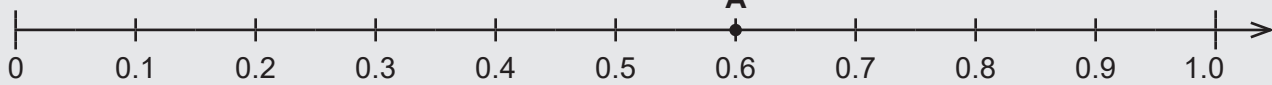
1. Write a decimal and a fraction for each point on the number line.

A   B   C   D

0   0.1   0.2   0.3   0.4   0.5   0.6   0.7   0.8   0.9   1.0
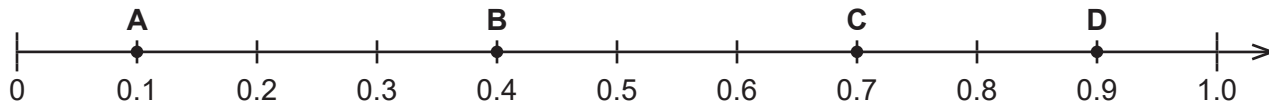
	A	B	C	D
Decimal	*0.1*			
Fraction	$\frac{1}{10}$			

2. Mark the decimal or fraction on the number line with a dot and a letter.

0   0.1   0.2   0.3   0.4   0.5   0.6   0.7   0.8   0.9   1.0
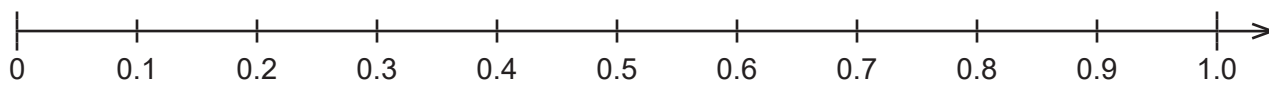
A. 0.3   **B.** 0.2   **C.** 0.4   **D.** $\frac{7}{10}$

E. $\frac{9}{10}$ **F.** $\frac{6}{10}$ **G.** 0.1   **BONUS ▶ H.** $\frac{99}{100}$

This number line is divided into hundredths. Point A is at $\frac{28}{100} = 0.28$

A

0   0.10   0.20   0.30   0.40   0.50   0.60   0.70   0.80   0.90   1.00
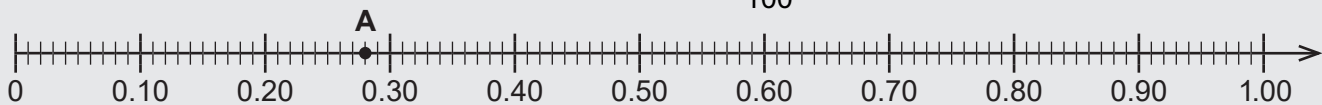
3. Write a fraction and a decimal for each point on the number line.

B   C   A   D

0   0.10   0.20   0.30
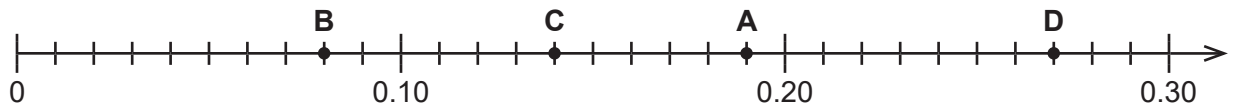
A. ☐ _____   **B.** ☐ _____   **C.** ☐ _____   **D.** ☐ _____

4. Mark the decimal or fraction on the number line with a dot and a letter.

0   0.10   0.20   0.30
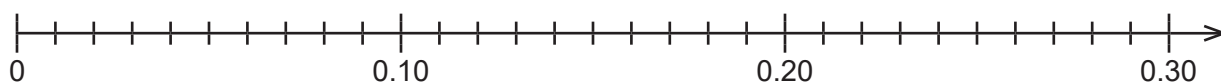
A. 0.13   **B.** $\frac{1}{100}$ **C.** 0.04   **D.** $\frac{17}{100}$

5. a) Estimate the position of the decimal or fraction on the number line by marking a dot and a letter. Hint: Change all the fractions into decimals.

0   0.1   0.2   0.3   0.4   0.5   0.6   0.7   0.8   0.9   1.0
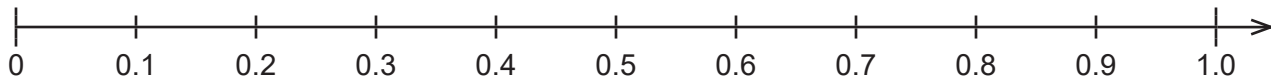
A. $\dfrac{10}{100}$ **B.** 0.83   **C.** $\dfrac{8}{10}$ **D.** $\dfrac{74}{100}$ **E.** 0.5

_0.10_   _____   _____   _____   _____

b) Order $\dfrac{10}{100}$, $\dfrac{8}{10}$, and 0.5 from least to greatest. _____ < _____ < _____

6. Change all decimals to fractions with denominator 100. Write the fractions in order from greatest to least.

a) $\dfrac{27}{100}$ 0.9   0.25

| $\dfrac{27}{100}$ | $\dfrac{90}{100}$ | $\dfrac{25}{100}$ |

| $\dfrac{90}{100}$ | > | $\dfrac{27}{100}$ | > | $\dfrac{25}{100}$ |

b) 0.2   0.8   0.35

□ □ □

□ > □ > □

c) 0.3 $\dfrac{22}{100}$ $\dfrac{39}{100}$

□ □ □

□ > □ > □

d) 0.45 $\dfrac{47}{100}$ 0.4

□ □ □

□ > □ > □

e) 0.08 $\dfrac{7}{100}$ 0.1

□ □ □

□ > □ > □

f) 0.24 $\dfrac{4}{10}$ $\dfrac{20}{100}$

□ □ □

□ > □ > □

7. Use the numbers 10 and 100 as denominators to make the statement true.

a) $\dfrac{6}{10} > \dfrac{6}{100}$

b) $\dfrac{6}{\rule{1cm}{0.4pt}} < \dfrac{6}{\rule{1cm}{0.4pt}}$

BONUS ▶ $\dfrac{7}{\rule{1cm}{0.4pt}} < \dfrac{6}{\rule{1cm}{0.4pt}}$

8. Use the numbers 5 and 60 as numerators to make the statement true.

a) $\dfrac{5}{100} < \dfrac{60}{100}$

b) $\dfrac{\rule{1cm}{0.4pt}}{10} < \dfrac{\rule{1cm}{0.4pt}}{100}$

9. a) Cam thinks $\dfrac{3}{10}$ is less than 0.30 because 3 is less than 30. Do you agree? Explain.

b) Lily thinks 0.1 is less than $\dfrac{8}{100}$ because 8 is greater than 1. Do you agree? Explain.

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56   **Number Sense 5-52**

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1.

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

0   0.1   _____   _____   _____   _____   _____   _____   _____   _____   1
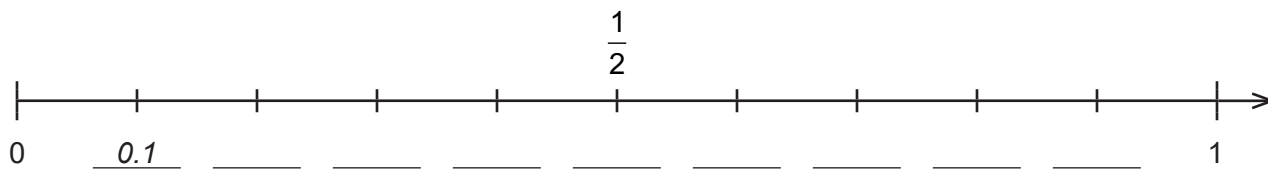
a) Write a decimal for each mark on the number line above.

b) Which decimal is equal to one half? $\frac{1}{2} =$ _____

c) Use the number line above to compare the pair of numbers. Write $<$, $>$, or $=$ in the box.

i) 0.7 $\boxed{>}$ $\frac{1}{2}$ ii) $\frac{1}{2}$ $\boxed{}$ 0.6   iii) $\frac{1}{2}$ $\boxed{}$ 0.4

iv) $\frac{1}{2}$ $\boxed{}$ 0.5   v) 0.1 $\boxed{}$ $\frac{1}{2}$ vi) 0.2 $\boxed{}$ $\frac{1}{2}$

2. Use the number lines to compare the pair of numbers. Write $<$, $>$, or $=$ in the box.
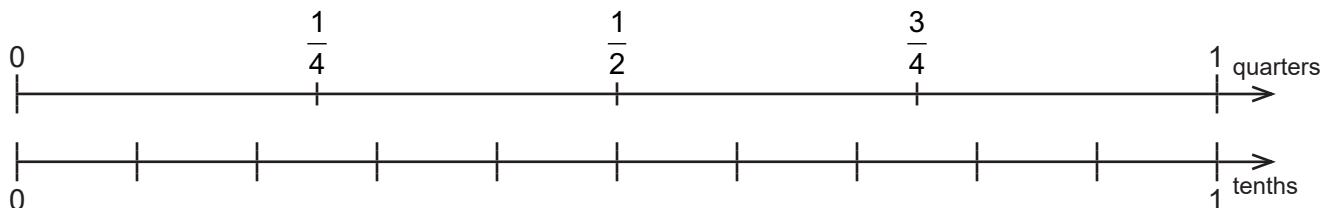
a) 0.8 $\boxed{}$ $\frac{3}{4}$ b) 0.4 $\boxed{}$ $\frac{7}{10}$ c) $\frac{1}{4}$ $\boxed{}$ 0.4   d) 0.2 $\boxed{}$ $\frac{1}{4}$

e) 0.5 $\boxed{}$ $\frac{1}{2}$ f) 0.3 $\boxed{}$ $\frac{1}{4}$ g) $\frac{3}{4}$ $\boxed{}$ 0.6   h) $\frac{3}{4}$ $\boxed{}$ 0.7

3. Use the number lines to compare the pair of numbers. Write $<$, $>$, or $=$ in the box.
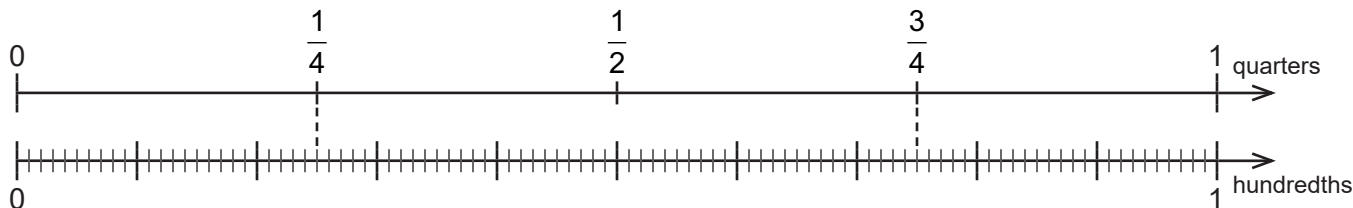
a) 0.21 $\boxed{}$ $\frac{1}{4}$ b) $\frac{1}{2}$ $\boxed{}$ 0.54   c) 0.75 $\boxed{}$ $\frac{3}{4}$ d) 0.26 $\boxed{}$ $\frac{1}{4}$
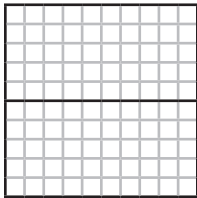
e) 0.74 $\boxed{}$ $\frac{3}{4}$ f) $\frac{1}{4}$ $\boxed{}$ 0.25   g) 0.50 $\boxed{}$ $\frac{1}{2}$ h) $\frac{3}{4}$ $\boxed{}$ 0.80

4.

Shade $\frac{1}{2}$ of the squares. Write two fractions and two decimals for $\frac{1}{2}$.

Fractions: $\frac{1}{2} = \frac{}{10} = \frac{}{100}$

Decimals: $\frac{1}{2} = 0.\underline{} = 0.\underline{}$

5.

Shade $\frac{1}{5}$ of the squares. Write two fractions and two decimals for $\frac{1}{5}$.

Fractions: $\frac{1}{5} = \frac{}{10} = \frac{}{100}$
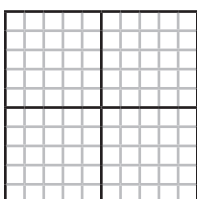
Decimals: $\frac{1}{5} = 0.\underline{} = 0.\underline{}$

6. Write equivalent fractions.

a) $\frac{2}{5} = \frac{}{10} = \frac{}{100}$

b) $\frac{3}{5} = \frac{}{10} = \frac{}{100}$

c) $\frac{4}{5} = \frac{}{10} = \frac{}{100}$

7.

Shade $\frac{1}{4}$ of the squares. Write a fraction and a decimal for $\frac{1}{4}$ and $\frac{3}{4}$.

Fractions: $\frac{1}{4} = \frac{}{100}$

Decimals: $\frac{1}{4} = 0.\underline{}$

Fractions: $\frac{3}{4} = \frac{}{100}$

Decimals: $\frac{3}{4} = 0.\underline{}$

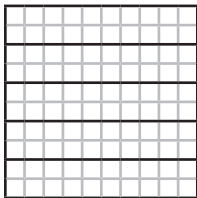**8.** Circle the greater number in the pair. Hint: First change all fractions and decimals to fractions with denominator 100.

a) $\frac{1}{2}$ 0.37

$\boxed{\dfrac{50}{100}}$ $\square$

b) $\frac{1}{4}$ 0.52

$\square$ $\square$

c) $\frac{2}{5}$ 0.42

$\square$ $\square$

d) 0.7 $\frac{3}{5}$

$\square$ $\square$

e) 0.23 $\frac{1}{5}$

$\square$ $\square$

f) 0.52 $\frac{1}{2}$

$\square$ $\square$

9. Write the numbers in order from least to greatest. Explain how you found your answer.

a) 0.7   0.32 $\frac{1}{2}$

b) $\frac{1}{4}$ $\frac{3}{5}$ 0.63

c) $\frac{2}{5}$ 0.35 $\frac{1}{2}$

NS5-54 Adding Decimals
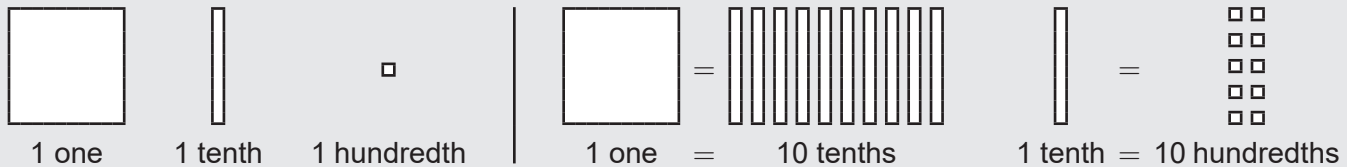
A base ten representation for decimal tenths and hundredths:

| 1 one | 1 tenth | 1 hundredth | 1 one = 10 tenths | 1 tenth = 10 hundredths |

1. Regroup every 10 tenths as 1 one.

a)

Ones	Tenths	
		_____ ones + _____ tenths
		_____ ones + _____ tenths } after regrouping

b) 14 tenths = _____ one + _____ tenths   c) 23 tenths = _____ ones + _____ tenths

d) 49 tenths = _____ ones + _____ tenths   e) 67 tenths = _____ ones + _____ tenths

2. Regroup so that each place value has a single digit.

a) 3 ones + 12 tenths = ___*4*___ ones + ___*2*___ tenths

b) 7 tenths + 14 hundredths = _____ tenths + _____ hundredths

c) 8 tenths + 15 hundredths = _____ tenths + _____ hundredths

d) 6 tenths + 24 hundredths = _____ tenths + _____ hundredths

e) 1 tenth + 89 hundredths = _____ tenths + _____ hundredths

3. Regroup 1 tenth for 10 hundredths.

a) 4 tenths + 0 hundredths = ___*3*___ tenths + ___*10*___ hundredths

b) 8 tenths + 0 hundredths = _____ tenths + _____ hundredths

c) 4 tenths + 1 hundredth = _____ tenths + _____ hundredths

d) 6 tenths + 8 hundredths = _____ tenths + _____ hundredths

e) 1 tenth + 9 hundredths = _____ tenths + _____ hundredths

BONUS ▶ 1 tenth + 89 hundredths = _____ tenths + _____ hundredths

4. Write a decimal for each shaded part. Then add the decimals and shade your answer.

a)

__0.25__ + __0.50__ = __0.75__

b)

_____ + _____ = _____

c)

_____ + _____ = _____

d)

_____ + _____ = _____

e)

_____ + _____ = _____

BONUS ▶

_____ + _____ = _____
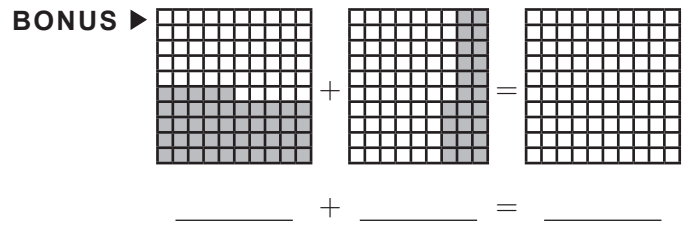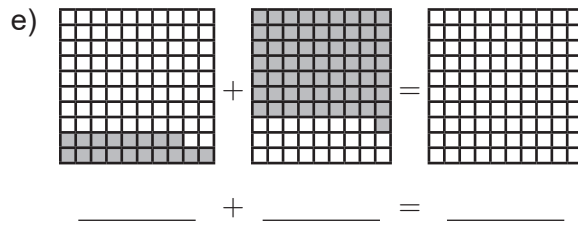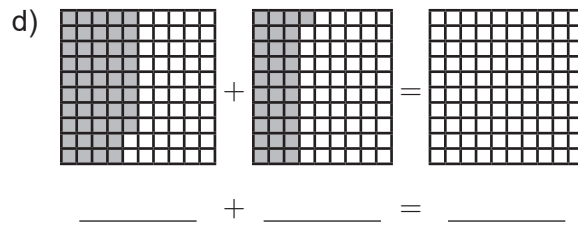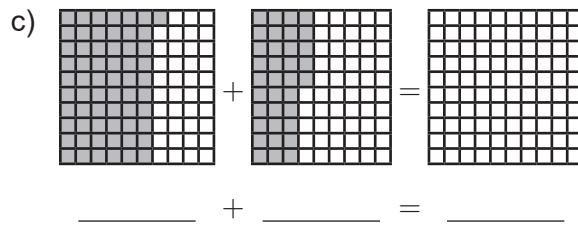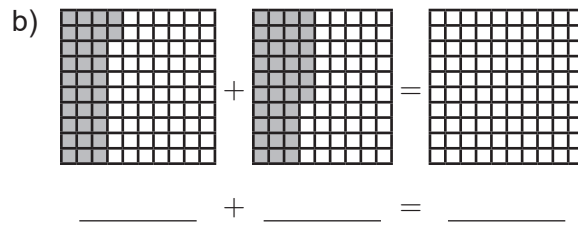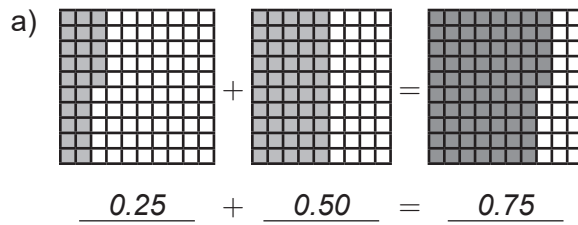
5. Add by adding each place value.

a) $41.2 + 7.48$

	Tens	Ones	Tenths	Hundredths
	4	1	2	
+		7	4	8
	4	8	6	8

b) $36.48 + 42.1$

	Tens	Ones	Tenths	Hundredths
+				

6. Add by adding each place value. Then regroup.

a) $4.65 + 0.73$

	Ones	Tenths	Hundredths
	4	6	5
+	0	7	3
	4	13	8
	5	3	8

← after regrouping →

b) $31.4 + 5.71$

	Tens	Ones	Tenths	Hundredths
+				

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7. Add the decimals by lining up the decimal points.

a) $0.41 + 0.37$

0 .	4	1
0 .	3	7
0 .	7	8

+

b) $0.52 + 0.46$

+

c) $0.05 + 0.83$

+

d) $0.4 + 0.04$

+

You can show regrouping on a grid. Example: $4.8 + 3.5$

1	
4 .	8
3 .	5
8 .	**3**

+

8 tenths + 5 tenths = 13 tenths were regrouped as **1** one and **3** tenths

---

8. Add the decimals by lining up the decimal points. You will need to regroup.

a) $0.7 + 0.48$

1		
0 .	7	
0 .	4	8
1 .	**1**	8

+

b) $0.26 + 0.65$

+

c) $0.63 + 0.84$

+

d) $0.17 + 0.43 + 1.32$

+

9. Add the decimals by lining up the decimal points. You may need to regroup.

a) $2.51 + 4.68$

+

b) $5.45 + 3.45$

+

c) $8.48 + 0.09$

+

d) $0.87 + 0.04$

+

10. The mass of a dime is 1.75 g, and the mass of a quarter is 4.4 g. What is the total mass of one dime and two quarters?
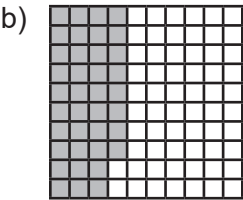
11. Bill adds $21.4 + 4.21$ on grid paper. He gets 63.5. What mistake did he make? Explain.

_____
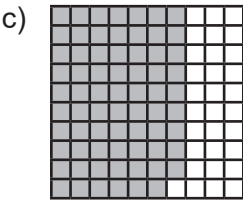
_____

NS5-55 Adding Decimals and Subtracting Decimals

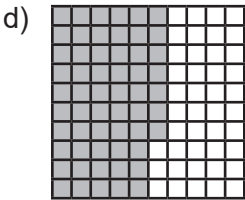**1.** Subtract by crossing out the correct number of shaded boxes. Give the answer as a decimal.

a)

$0.21 - 0.11 = $ _____

b)

$0.38 - 0.12 = $ _____

c)

$0.69 - 0.34 = $ _____

d)
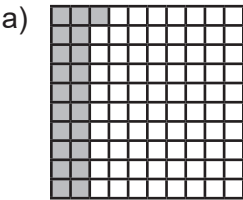
$0.57 - 0.25 = $ _____

2. Subtract the decimals by lining up the decimal points.

a) $0.74 - 0.31$

0	. 7	4
− 0	. 3	1
0	. 4	3
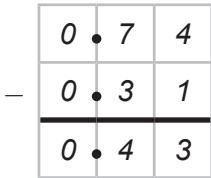
b) $0.65 - 0.24$
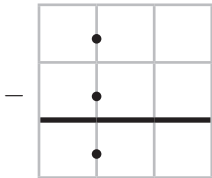
c) $3.47 - 2.2$
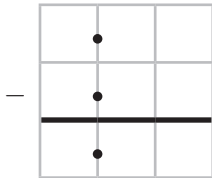
d) $6.49 - 0.35$
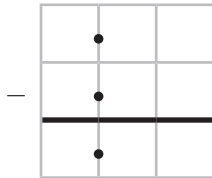
e) $2.51 - 1.51$
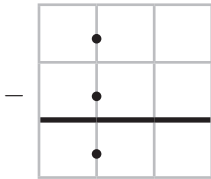
f) $3.79 - 2.06$
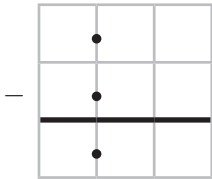
g) $8.84 - 7.10$
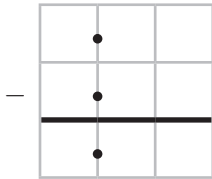
h) $5.19 - 3.07$
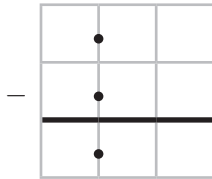
i) $4.08 - 4.04$
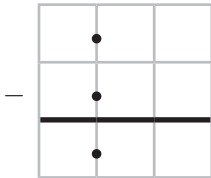
j) $2.15 - 2.03$
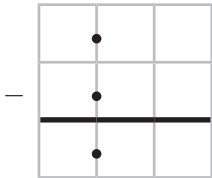
k) $5.52 - 2.41$
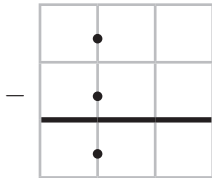
l) $9.83 - 2.70$
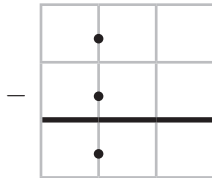
When subtracting decimals, you may have to regroup just like when you subtract whole numbers.

Example:

	5 .	7	0
−	1 .	2	4
	.		

		6	10
	5 .	7̸	0̸
−	1 .	2	4
	.		

		6	10
	5 .	7̸	0̸
−	1 .	2	4
	4 .	4	6
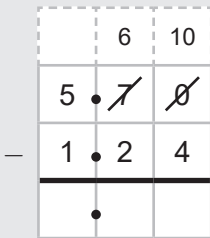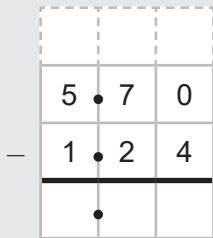
Regroup 1 tenth as 10 hundredths.
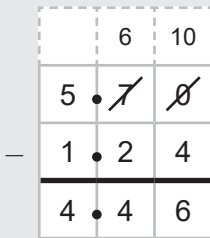
3. Subtract the decimals. Put a decimal point in your answer on the grid.

a) $0.81 - 0.58$

	7	11
0 •	8̸	1̸
− 0 •	5	8
0 •	2	3

b) $5.72 - 3.56$

c) $6.15 - 4.2$

d) $2.46 - 0.38$

e) $4.4 - 2.65$

f) $31.1 - 22.2$

g) $7.45 - 6.68$

h) $5.20 - 1.23$

4. Subtract the decimals on grid paper.

a) $0.87 - 0.26$

b) $6.15 - 4.04$

c) $5.83 - 3.69$

5. Add or subtract mentally.

a) $0.54 + 0.31 =$ _____

b) $4.95 - 2.84 =$ _____

c) $7.09 - 4.02 =$ _____

d) $2.37 + 1.22 =$ _____

e) $5.73 - 1.62 =$ _____

f) $8.71 - 1.71 =$ _____

g) $1.45 + 2.54 =$ _____

h) $4.35 - 2.12 =$ _____

i) $9.47 - 7.46 =$ _____

6. What is the difference in the thickness of these coins?

a) a quarter (1.58 mm) and a dime (1.22 mm)

b) a nickel (1.76 mm) and a quarter (1.58 mm)

7. Sara made coloured water for a project by mixing 0.05 L of blue dye with 0.85 L of water. How many litres of blue-coloured water did she make?

8. An average house cat's body and head are about 0.46 m long. The tail is about 0.30 m long. What is the total length of an average house cat?
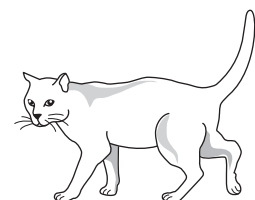
NS5-56 Dollar and Cent Notation

dollars	dollars	dollars
100¢ = $1.00	345¢ = $3.45	1843¢ = $18.43
dimes cents	dimes cents	dimes cents

1. Write the amount in cent notation and then in dollar notation.

   a) 4 nickels = ___20¢___ = ___$0.20___

   b) 6 dimes = _____ = _____

   c) 1 quarter = _____ = _____

   d) 5 nickels = _____ = _____

   e) 3 quarters = _____ = _____

   f) 8 dimes = _____ = _____

   g) 1 loonie = _____ = _____

   h) 5 loonies = _____ = _____

   i) 7 loonies = _____ = _____

   j) 10 dimes = _____ = _____

   BONUS ▶

   k) 4 loonies, 3 dimes, and 1 nickel = _____ = _____

   l) 3 toonies, 2 loonies, 1 quarter, 1 dime, and 2 nickels = _____ = _____

2. Complete the table.

	Amount in ¢	Dollars	Dimes	Cents	Amount in $
a)	143¢	1	4	3	$1.43
b)	47¢	0			
c)	305¢				
d)	3¢				

   BONUS ▶

	2016¢				

3. Write the amount in cent notation.

   a) $3.00 = ___300¢___

   b) $0.60 = _____

   c) $0.09 = _____

   d) $1.00 = _____

   e) $7.98 = _____

   f) $12.00 = _____

   g) $10.00 = _____

   h) $1.99 = _____

   i) $1.51 = _____

   j) $0.98 = _____

   k) $0.03 = _____

   l) $0.08 = _____

   m) $23.00 = _____
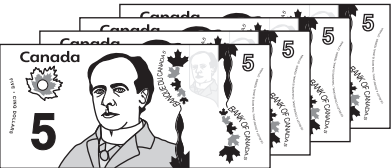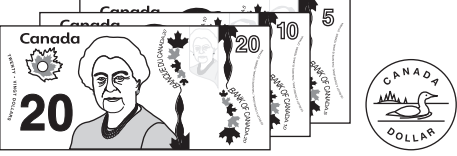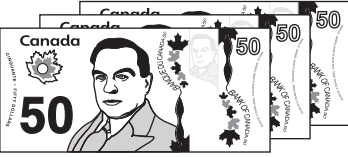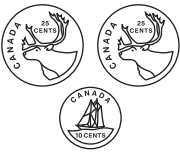
   n) $31.06 = _____

   o) $40.04 = _____

4. Write the amount in dollar notation.

a) 254¢ = ___*$2.54*___

b) 103¢ = _____

c) 216¢ = _____

d) 375¢ = _____

e) 300¢ = _____

f) 4¢ = _____

g) 607¢ = _____

h) 1908¢ = _____

i) 600¢ = _____

j) 99¢ = _____

k) 1200¢ = _____

BONUS ▶ 9008¢ = _____

5. Complete the table.

	Dollars		Cents		Total
a)		= ___$3___		= ___35¢___	___$3.35___
b)		= _____		= _____	_____
c)		= _____		= _____	_____
d)		= _____		= _____	_____
e)		= _____		= _____	_____
f)		= _____		= _____	_____

6. Lela paid for a notebook with 3 coins. The notebook cost $6.00. Which coins did she use?

7. Show two ways to make $5.25 with 6 coins and/or bills.

8. Change the amount in dollar notation to cent notation. Then circle the greater amount.

a) (175¢)   or $1.73   b) $1.00   or   10¢   c) 6¢   or $0.04

          173¢

d) $5.98   or   597¢   e) 600¢   or $6.05   f) $0.87   or   187¢

9. Write each amount in cent notation. Then circle the greater amount of money in the pair.

a)   three dollars and sixty-five cents   or   three hundred fifty-six cents

   _____   _____

b)   nine dollars and twenty-eight cents   or   nine dollars and eighty-two cents

   _____   _____

c)   eight dollars and seventy-five cents   or $8.57

   _____   _____

10. Which is a greater amount of money: 168¢ or $1.65? Explain.

11. Marla has 1014¢, Ray has eleven dollars and forty-one cents, and Jessica has $11.04.
Write Marla's amount and Ray's amount in dollar notation. Then order the three amounts
from least to greatest.

Marla's amount: 1014¢ = $_____

Ray's amount: eleven dollars and forty-one cents = $_____

_____ < _____ < _____

12. Sammy has 2308¢. Jacob has 2083¢. Write an amount in dollar notation that is …

a)   greater than both amounts. _____

b)   less than both amounts. _____

c)   between the two amounts. _____

NS5-57 Adding and Subtracting Money

1. Add.

a) $5.45 + $3.23

$	5	.	4	5
+ $	3	.	2	3
$		.		

b) $26.15 + $32.23

$		.		
+ $		.		
$		.		

c) $19.57 + $50.32

$		.		
+ $		.		
$		.		

2. Add. You will have to regroup.

a)

$	1	6	.	6	0
+ $	2	3	.	7	5
$			.		

b)

$	2	7	.	4	5
+ $	4	5	.	1	2
$			.		

c)

$	8	7	.	4	1
+ $		6	.	3	9
$			.		

d)

$	3	4	.	6	0
+ $	2	6	.	0	0
$			.		

e)

$	3	2	.	4	7
+ $	4	4	.	2	5
$			.		

f)

$	1	6	.	0	8
+ $	4	8	.	0	5
$			.		

3. Subtract. You will have to regroup.

a)

$	2	4	.	5	0
− $	2	1	.	7	5
$			.		

b)

$	3	6	.	4	5
− $	1	3	.	8	0
$			.		

c)

$	4	7	.	2	3
− $		6	.	7	2
$			.		

d)

$	5	3	.	0	4
− $	1	6	.	0	3
$			.		

e)

$	7	0	.	6	2
− $	2	5	.	5	1
$			.		

f)

| $	8	4	.	1	7
− $	3	9	.	0	9
$			.		

4. Jasmin bought a pair of mittens for $7.25 and a T-shirt for $13.53. How much did Jasmin spend in total?

5. A library spent $270.25 on novels and $389.82 on movies and music. How much did the library spend in total?

6. Eric bought two baseball hats that cost $21.30 each. Add to find out how much he paid in total.

7. Raj has $25. If he buys a board game for $9.50 and a book for $10.35, will he have enough money left to buy a second book for $5.10?
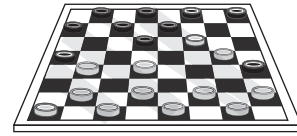
8. The regular price for a pair of glasses is $69.99. Today only, they are on sale for $10.50 off per pair. If Lynn buys her glasses today, how much will she pay?

BONUS ▶ If Lynn buys one pair of glasses today and one pair next week, how much will she pay in total?

9. Answer the question by looking at the items and their prices below.

a) If you bought a pair of shoes, a camera, and a water bottle, how much would you pay?

b) Which costs more: shoes and a soccer ball or pants?

c) Could you buy a water bottle, a hockey shirt, and shoes with $60? Explain how you found the answer.

d) What is the total cost of the three most expensive items?

BONUS ▶ How much would it cost to buy two pairs of pants? Explain how you could use a mental math strategy to simplify the calculation.

$28.50

$42.89

$49.95

$35.47

$12.30

$15.64
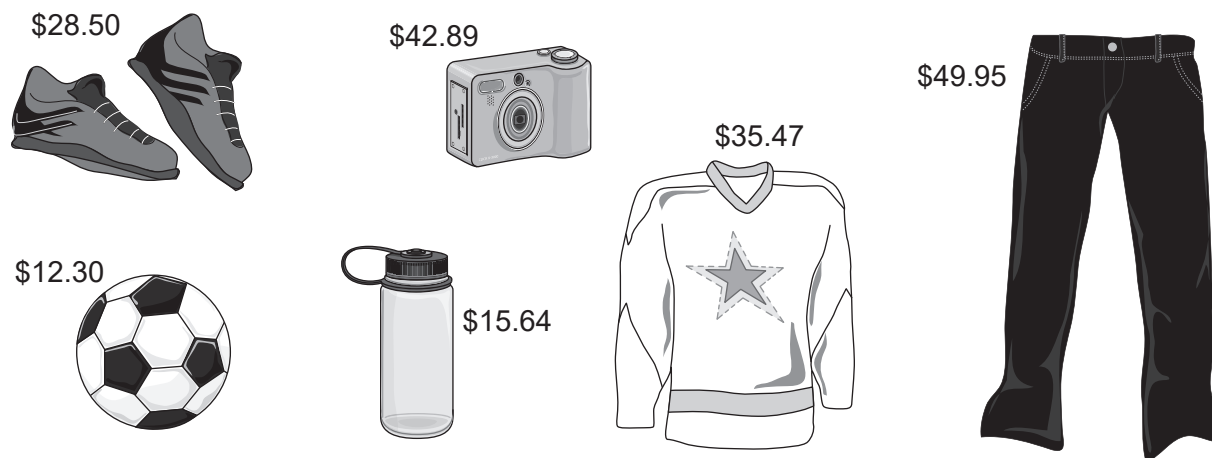
10. Try to find the answer mentally.
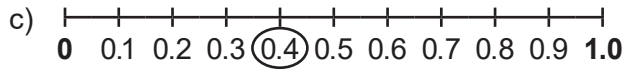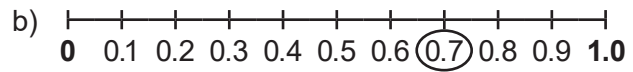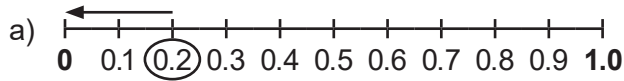
a) How much do 4 loaves of bread cost at $2.10 each?

b) Apples cost 50¢ each. How many could you buy with $3.00?

c) Permanent markers cost $3.10 each. How many could you buy if you had $12.00?

11. Sam spent $3.27 on apples, 563¢ on peaches, and four dollars and ninety-six cents on grapes. Write each amount in dollar notation. Use graph paper to find the total amount Sam spent.

NS5-58 Rounding Decimals

1. Draw an arrow to the 0 or to the 1 to show whether the circled decimal is closer to 0 or 1.

a)

0 0.1 (0.2) 0.3 0.4 0.5 0.6 0.7 0.8 0.9 **1.0**

b)

0 0.1 0.2 0.3 0.4 0.5 0.6 (0.7) 0.8 0.9 **1.0**

c)

0 0.1 0.2 0.3 (0.4) 0.5 0.6 0.7 0.8 0.9 **1.0**

d)

0 0.1 0.2 0.3 0.4 0.5 (0.6) 0.7 0.8 0.9 **1.0**
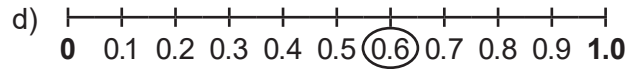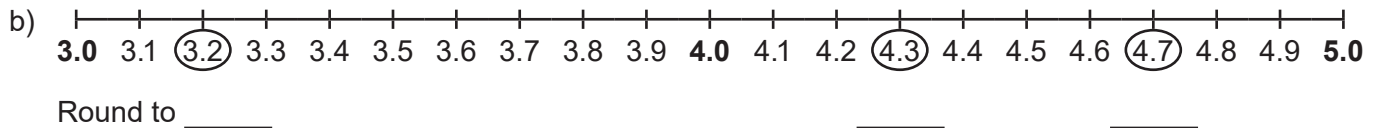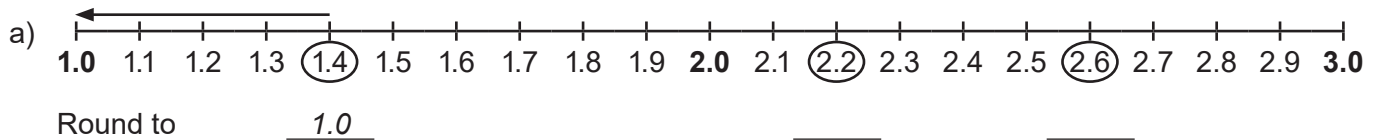
2. a) Which decimal numbers between 0 and 1.0 are closer to …

i) 0? _____

ii) 1.0? _____

b) Why is 0.5 a special case? _____

3. Draw an arrow to show which **whole number** you would round the circled number to.
Then round to the nearest whole number.

a)

1.0 1.1 1.2 1.3 (1.4) 1.5 1.6 1.7 1.8 1.9 **2.0** 2.1 (2.2) 2.3 2.4 2.5 (2.6) 2.7 2.8 2.9 **3.0**

Round to _____1.0____ _____ _____

b)

3.0 3.1 (3.2) 3.3 3.4 3.5 3.6 3.7 3.8 3.9 **4.0** 4.1 4.2 (4.3) 4.4 4.5 4.6 (4.7) 4.8 4.9 **5.0**

Round to _____ _____ _____

4. If the statement is correct, write ✓ in the box. If the statement is not correct, write ✗ in the box.

a) 3.6 is closer to 3.0 than to 4.0. ✗

b) 1.4 is closer to 1.0 than to 2.0. ✓

c) 9.2 is closer to 10.0 than to 9.0. ☐

d) 11.7 is closer to 11.0 than to 12.0. ☐

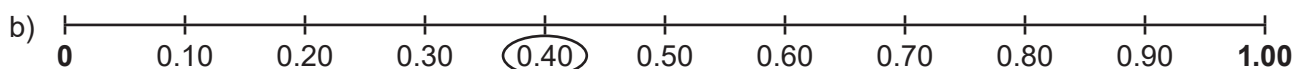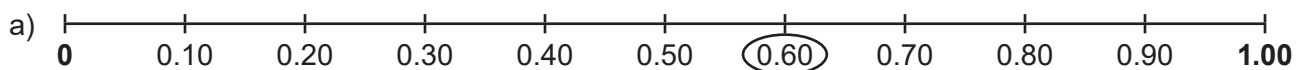e) 25.6 is closer to 26.0 than to 25.0. ☐

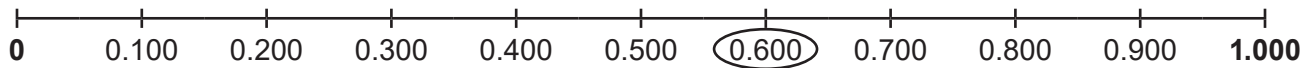f) 111.7 is closer to 111.0 than to 112.0. ☐

g) 0.4 is closer to 1.0 than to 0. ☐

BONUS ▶
1009.4 is closer to 1010.0 than to 1009.0. ☐

**5.** Draw an arrow to show whether the circled number is closer to 0 or 1.00.

a)

0 0.10 0.20 0.30 0.40 0.50 (0.60) 0.70 0.80 0.90 **1.00**

b)

0 0.10 0.20 0.30 (0.40) 0.50 0.60 0.70 0.80 0.90 **1.00**

6. Draw an arrow to show whether the circled number is closer to 0 or 1.000.

```
├────┼────┼────┼────┼────┼────┼────┼────┼────┼────┤
0    0.100  0.200  0.300  0.400  0.500  (0.600)  0.700  0.800  0.900  1.000
```

7. Draw an arrow to show which whole number you would round the circled number to.

```
├────┼────┼────┼────┼────┼────┼────┼────┼────┼────┤
1.00  1.10  1.20  1.30  1.40  1.50  1.60  1.70  1.80  1.90  2.00
```
(1.33)   (1.78)

8. Draw an arrow to show which whole number you would round the circled number to.

```
├────┼────┼────┼────┼────┼────┼────┼────┼────┼────┤
4.00  4.10  4.20  4.30  4.40  4.50  4.60  4.70  4.80  4.90  5.00
```
(4.26)   (4.72)
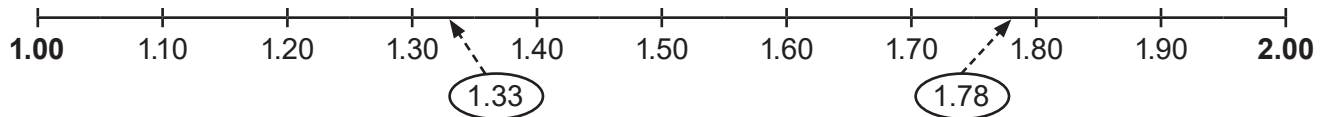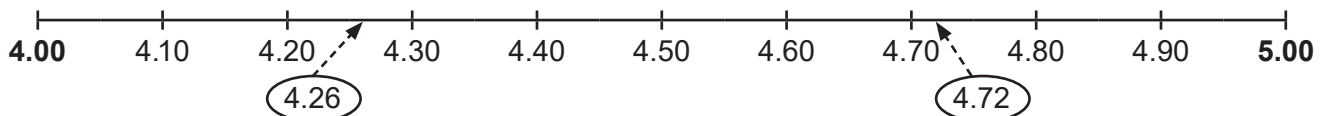
REMINDER ▶ If the tenths digit in the decimal is …

0, 1, 2, 3, or 4 — you round *down*.   5, 6, 7, 8, or 9 — you round *up*.

---

9. Round to the nearest whole number.

a) 2.2 | 2 | b) 2.6 | 3 | c) 7.3 | |

d) 5.8 | | e) 9.4 | | f) 8.5 | |

g) 11.1 | | h) 30.7 | | i) 19.6 | |

10. Round to the nearest tenth. Underline the tenths digit first. Then put your pencil on the digit to the right (the hundredths digit). This digit tells you whether to round up or down.

a) 1.4̲5 | 1.5 | b) 1.83 | | c) 3.61 | |

d) 3.42 | | e) 5.55 | | f) 6.67 | |

g) 6.56 | | h) 8.47 | | i) 9.38 | |
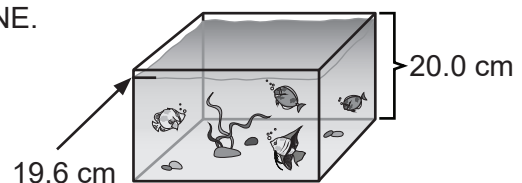
j) 7.94 | | k) 4.97 | | l) 9.96 | |

11. A fish tank is 20.0 cm deep. It has a line marked on it at 19.6 cm.
The instructions say: CAUTION: DO NOT FILL ABOVE THIS LINE.

a) What is the nearest whole number to 19.6?

b) In this case, why would you not round 19.6 to the nearest whole number? Explain.

20.0 cm

19.6 cm

NS5-59 Estimating Sums and Differences for Decimals

Mathematicians use the symbol ≈ to mean "**approximately equal to**."

1. Estimate the sum or difference using the whole-number parts of the decimal.
   Example: For **14**.35 + **0**.23 + **5**.74, estimate **14** + **0** + **5** = 19

   a) $3.9 + 4.25 \approx$ ___ + ___ = ___

   b) $7.03 - 5.42 \approx$ ___ − ___ = ___

   c) $3.2 + 5.1 + 4.6 \approx$ ___ + ___ + ___ = ___

   d) $9.6 - 3.0 - 4.9 \approx$ ___ − ___ − ___ = ___

2. Estimate by rounding to the nearest whole number. Then add or subtract.

   a)   3.2 $\boxed{3}$
       + 1.3 + $\boxed{1}$
       _____
              4

   b)   1.6 $\boxed{}$
       + 0.6 + $\boxed{}$
       _____

   c)   5.6 $\boxed{}$
       − 3.1 − $\boxed{}$
       _____

   d)   6.8 $\boxed{}$
       − 0.5 − $\boxed{}$
       _____

   e)   1.9 $\boxed{}$
       + 0.8 + $\boxed{}$
       _____

   f)   0.4 $\boxed{}$
       − 0.2 − $\boxed{}$
       _____

   g)   8.6 $\boxed{}$
       + 1.1 + $\boxed{}$
       _____

   h)   29.8 $\boxed{}$
       + 68.9 + $\boxed{}$
       _____

   i) $0.6 + 0.3$ j) $0.9 - 0.4$ k) $2.6 + 0.5$ l) $3.5 - 0.5$

   m) $1.3 - 1.2$ n) $1.5 + 0.9$ o) $2.1 - 0.7$ **BONUS ▶**
   $2001.4 - 0.9$

3. Estimate by rounding to the nearest tenth. Then add or subtract.

   a)   0.42 ⟶ $\boxed{0.4}$
       + 5.23 ⟶ + $\boxed{5.2}$
       _____
                 5.6

   b)   0.28 ⟶ $\boxed{}$
       + 0.14 ⟶ + $\boxed{}$
       _____

   c)   2.62 ⟶ $\boxed{}$
       − 0.19 ⟶ − $\boxed{}$
       _____

   d)   4.87 ⟶ $\boxed{}$
       − 4.57 ⟶ − $\boxed{}$
       _____

   e) $0.73 + 2.17 \approx$ _0.7 + 2.2 = 2.9_

   f) $0.89 - 0.46 \approx$ _____

   g) $0.63 + 0.26 \approx$ _____

   h) $3.82 - 2.47 \approx$ _____

   i) $0.48 + 2.27 \approx$ _____

   j) $126.42 - 126.37 \approx$ _____

4. The decimal tenths that could be rounded to 7 are from 6.5 to 7.4.
Which decimal tenths could be rounded to 17? Explain how you know.

For Questions 5 to 7, estimate the answer before calculating.

5. Mary wants to buy a backpack for $24.99, a tennis racket for $36.50, and a hockey shirt for $19.99. How much will the three items cost altogether?

6. The average temperature in Saint John's, NL, in April is 1.9°C. The average temperature in Saint John's, NL, in August is 15.5°C. What is the difference between the two average temperatures?

7. The school is 1.7 km from the library and 2.3 km from the house.
The library is 0.7 km from the house.

   a) Find the distance from the house to the school to the library and back to the house.
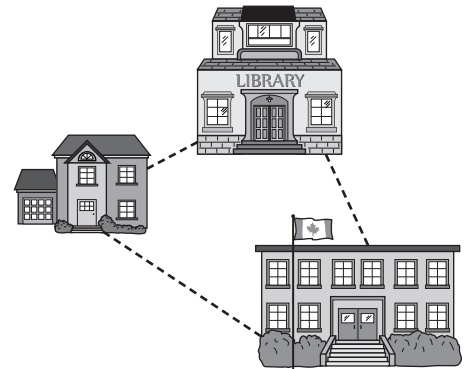
   b) How much farther is the school from the library than the library is from the house?

8. At a school track meet, the student whose long jump was 2.37 m won first prize. Second prize went to the student who jumped 2.19 m.

   a) Was the difference between the jumps more or less than 10 cm?

   b) Round both jumps to the nearest tenth. What is the difference between the rounded amounts?

   c) Make up two jumps that would round to the same number when rounded to the tenths.