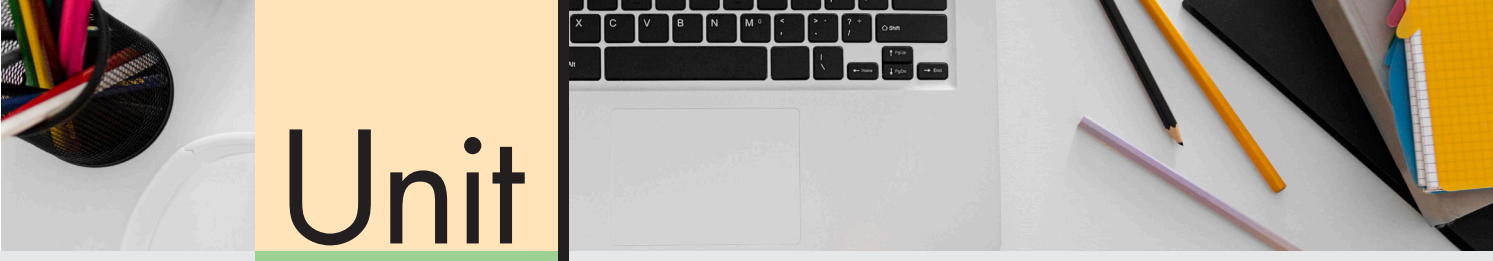
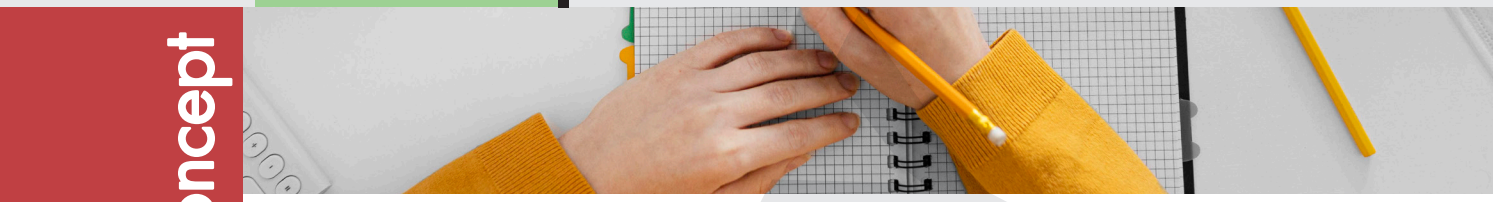


Unit 1 Decimal Place Value and Computation



Concept

1.1 Decimals to the Thousandths Place

Lessons 1&2: The Journey Begins / Decimals to the Thousandths Place

Learning Objectives:

By the end of this lesson, the student will be able to:

- I can read numbers from the Milliards place to the Hundredths place.
- I can identify the value of digits from the Milliards place to the Hundredths place.
- I can read decimal numbers to the Thousandths place.
- I can write decimal numbers to the Thousandths place.

Lessons 3&4: Place Value Shuffle / Composing and Decomposing Decimals

Learning Objectives:

By the end of this lesson, the student will be able to:

- I can explain how a digit changes value as it moves to the left or right in a decimal or whole number.
- I can compose and decompose decimals in multiple ways.

Lesson 5: Comparing Decimals

Learning Objectives:

By the end of this lesson, the student will be able to:

- I can compare decimals to the Thousandths place.

Lesson 6: Rounding Decimals

Learning Objectives:

By the end of this lesson, the student will be able to:

- I can round numbers to the nearest Tenth, Hundredth, or Thousandth.

Lessons 1&2 The Journey Begins Decimals to the Thousandths Place

Remember

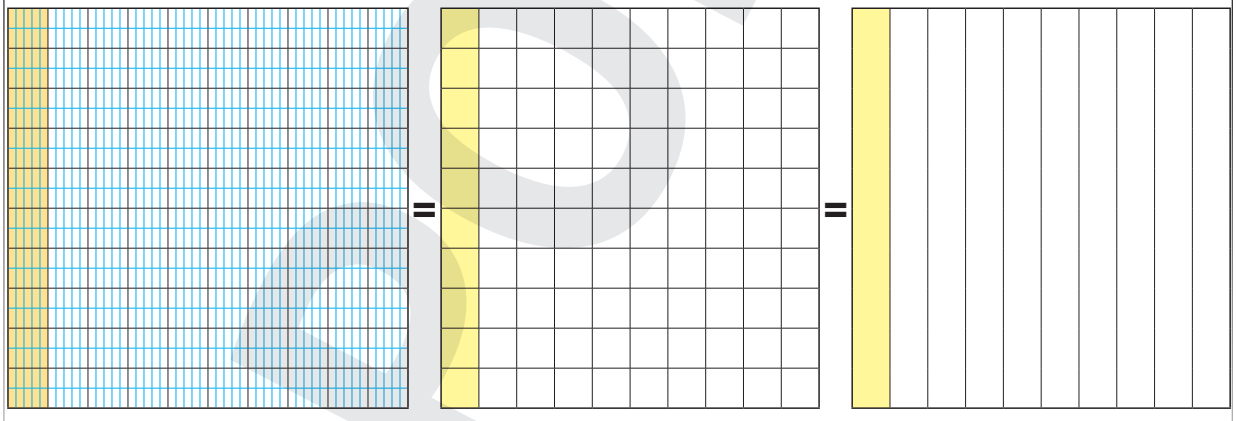
Decimal fraction

Is a number that represents a value less than 1 but greater than 0 .

The whole one can be divided into

Ten equal parts	One hundred equal parts	One thousand equal parts
Each part is called 0.1	each part is called 0.01	each part is called 0.001

Note that: In decimals, zeros can be added to the right of the last non-zero digit without changing the value of the number.



0.1 = **0.10** = **0.100**

(one tenth) **(ten hundredths)** **(hundred thousandths)**

Also: 0.2 = 0.20 = 0.200 , 0.3 = 0.30 = 0.300 , ... and so on

Decimal Number

- Is a number that represents a value greater than 1
- The decimal number consists of two parts separated by a decimal point

Integer part (whole number)
To the left of the decimal point

Decimal parts (decimal fraction)
To the right of the decimal point

357 . 94

It reads: three hundred fifty-seven, **and** ninety-four hundredths

Reading numbers from one milliard to thousandths

Learn To read any decimal :

- Divide the integer into numerical groups according to the place value table
- Read the number from the left, each number group followed by its name.
- Read the decimal parts followed by the name of the last decimal part on the right.

The whole number										Decimal Point	Decimals		
Milliards	Millions			Thousands			Ones				Tenths	Hundredths	Thousands
Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones				
6	0	0	8	0	4	5	1	7	0	.	1	7	
6 Milliards	8 Million			45 Thousand			170				17 Hundredths		

The previous number (6,008,045,170.17) reads:

Six milliard , eight million, forty-five thousand, one hundred seventy **and** seventeen hundredths

Note the reading of the following numbers:

a **2,450 . 8** **is read:** two thousand, four hundred fifty, **and** eight tenths.

b **705,012 . 05** **is read:** seven hundred five thousand, twelve, **and** five hundredths.

c **5,027 . 008** **is read:** five thousand, twenty seven , **and** eight thousandths.

d **63,020.436** **is read:** sixty-three thousand, twenty, **and** four hundred thirty-six thousandths

1 Write the following numbers: (In Standard Form)

a Five thousand, six hundred , ninety-seven, **and** five tenths ..... .

b Thirty thousand, fifteen, **and** seven hundredths ..... .

c Seven million, two hundred five, **and** twenty-nine hundredths. ..... .

d seventy-three million, seven thousand, **and** thirty-one thousandths

..... .

e Six milliard, five million, one hundred **and** seventy-six thousandths

..... .

2 Write the following numbers: (In Word Form)

a 45,231.7: ..... .

b 125.39: ..... .

c 20.09: ..... .

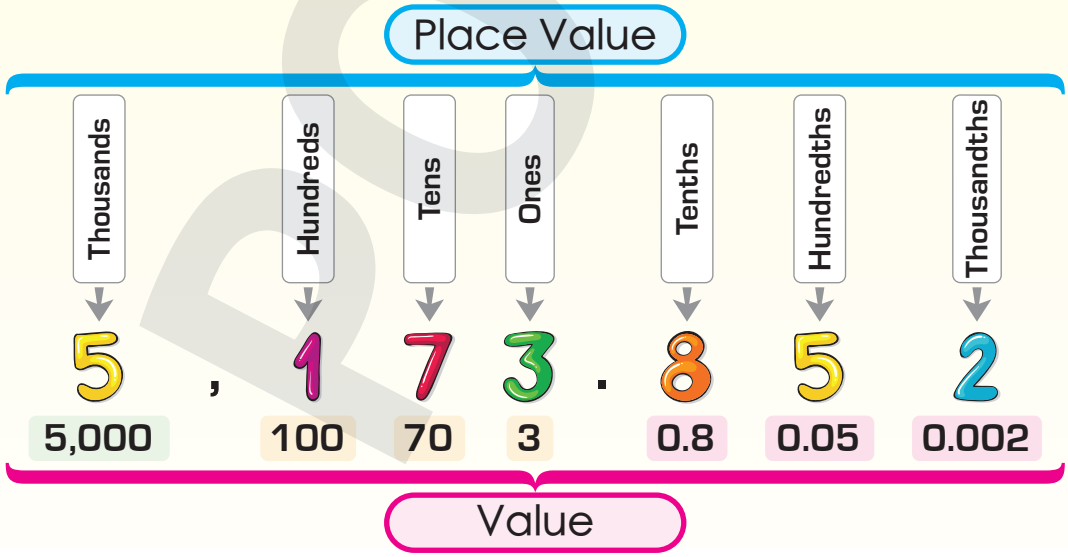
d 63,247.008: ..... .

e 500.609: ..... .

The value of digits from one milliards to one thousandth

Learn

- The place value and the value of each digit can be observed in the number 495,173.852 as follows:



3 Complete the following:

a In 56,258.96 , the digit 9 is in ..... place and its value is ..... .

b In 870,22.8 , the digit 7 is in the ..... place and its value is ..... .

c In 605.234 , the digit 0 is in the ..... place and its value is ..... .

d In 2,845.127 , the digit 5 is in the ..... place and its value is ..... .

4 Write the value and the place value of the encircled digit in the following numbers:

	Number	Place Value	Value
a	452,207.5(6)	.....	.....
b	6,500,(7)39.7	.....	.....
c	9,009.00(9)	.....	.....
d	(3)7,000,157.128	.....	.....
e	80,218.(0)39	.....	.....

Notes

To form the largest decimal number from a given digit:

- Arrange the digits from right to left from smallest to largest with one digit in the decimal part (to the right of the decimal point) in the tenths place.

To form the smallest decimal from a given digit:

- Arrange the digits from right to left from largest to smallest, with three digits in the decimal part (to the right of the decimal point) in the places (tenths - hundredths - thousandths).

Example: **Use the digits shown to form the largest and smallest decimal possible numbers:**

a (6,8,3,2,8,5,0,5): The **greatest** decimal is : 8,865,530.2
The **smallest** decimal is: 20,355.688

b (9,3,8,5,2): The **greatest** decimal is : 9,853.2
The **smallest** decimal is: 23.589

5 Complete the following table:

	Digits	Greatest Decimal	Smallest Decimal
a	6,5,7,8,3,2,4	.....	.....
b	8,3,0,7,4	.....	.....
c	3,2,8,7,3,5,0,7	.....	.....
d	9,3,2,5,3,7,4	.....	.....
e	6,2,4,3	.....	.....

Assessment on Lessons 1 & 2

First: Complete all of the following:

1. "Nine milliard, ninety thousand, **and** nine thousandths" (in digits): ..... .
2. 6,200.09 (in **word** form): ..... .
3. The place value of the digit **9** in the number 596,258.27 is ..... .
4. The largest **decimal** formed from of the digits (9, 8, 0, 2, 9, 5) is ..... .
5. The value of the digit **0** in the number 653,852.208 is ..... .

Second: Choose the correct answer:

1. Four hundred million, thirty thousand, and thirty hundredths = ...
   a) 400,030,000.30 b) 400,030.03 c) 4,030,000.30 d) 430.30
2. 3,000,003.003 in word form: ..... .
   a) Three hundred three million, and three thousandths
   b) Three million, three, and three thousandths
   c) Three million, three thousand, and three thousandths
   d) Three hundred thousand, three, and three thousandths
3. In the number ..... the place value of the number 5 is hundredths.
   a) 500.46 b) 46.005 c) 40.56 d) 46,500
4. The smallest decimal that can be formed from the numbers (5, 2, 3, 7, 2) is ..... .
   a) 22,357 b) 2,235.7 c) 223.57 d) 22.357
5. The digit that represents thousandths in the number: 4,568.178 is ..... .
   a) 1 b) 7 c) 8 d) 4

Third: Match:

1 Nine hundred million **and** nine hundred thousandths	a) 900,000.90
2 Nine hundred thousand **and** ninety hundredths	b) 909.009
3 Nine hundred , nine, **and** nine thousandths	c) 900,000,000.900
4 Nine hundred million, **and** nine thousandths	d) 900,000.09
5 Nine hundred thousand **and** nine hundredths	e) 900,000,000.009

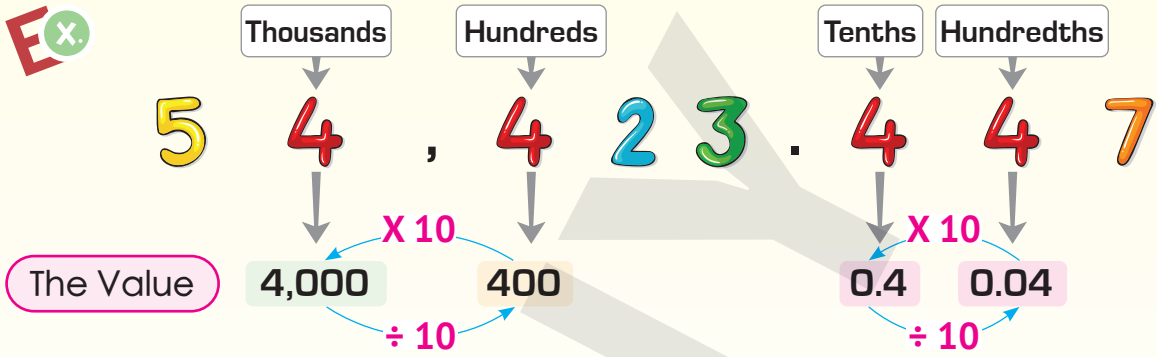
Fourth: Circle the hundredths digit and underline the hundreds digit:

7,589.023 , 56,028.893 , 528,159. 35 , 256.258

Lessons 3&4 Place Value Shuffle Composing and Decomposing Decimals

Learn The value of the digit changes within the number by changing its place:

Ex.



From the above **The value of the digit:**

- Increases by 10 times **(X 10)** as it moves to the left
- Decreases by 10 times **(÷10)** as it moves to the right

Learn Using the place value chart to solve multiplying and dividing by 10 problems

Example: **Use place value chart to solve the following problems: 75.4 x 10**

The whole number						Decimal Point	Decimals		
Thousands			Ones						
Hundreds	Tens	Ones	Hundreds	Tens	Ones		Tenths	Hundredths	Thousands
				7	5	.	4		
			7	5	4				

- The value of the 7 increased by a factor of 10 from 70 to 700
- The value of the 5 increased by a factor of 10 from 5 to 50
- The value of the 4 increased by a factor of 10 from 0.4 to 4

Therefore:

75.4 754

The value of the whole number **75.4** increased by a factor of **10** from **75.4** to **754** , **So:** 75.4 X 10 = 754

Notes

- When multiplying by **10** → Move all digits of the number one place to the left
- When dividing by **10** → Move all digits of the number one digit to the right

1 **Use place value charts to solve the following problems.**
Fill in the blanks to show how the value of each digit has changed:

a 386 X 10

The whole number						Decimal Point	Decimals		
Thousands			Ones						
Hundreds	Tens	Ones	Hundreds	Tens	Ones		Tenths	Hundredths	Thousands
						.			
						.			

- The value of the ..... (increased/decreased) by a factor of **10** from ..... To ..... .
- The value of the ..... (increased/decreased) by a factor of **10** from ..... To ..... .
- The value of the ..... (increased/ decreased) by a factor of **10** from ..... To ..... .

- Therefore, The value of the whole number ..... (increased/decreased) by a factor of **10** from ..... to ..... , **So: 386 X 10 =** ..... .

b 2.5 X 10

The whole number						Decimal Point	Decimals		
Thousands			Ones						
Hundreds	Tens	Ones	Hundreds	Tens	Ones		Tenths	Hundredths	Thousands
						.			
						.			

- The value of the ..... (increased/decreased) by a factor of **10** from ..... To ..... .
- The value of the ..... (increased/decreased) by a factor of **10** from ..... To ..... .
- The value of the ..... (increased/ decreased) by a factor of **10** from ..... To ..... .

- Therefore, The value of the whole number ..... (increased/decreased) by a factor of **10** from ..... to ..... , **So: 2.5 X 10 =** ..... .

c 915 ÷ 10

The whole number						Decimal Point	Decimals		
Thousands			Ones						
Hundreds	Tens	Ones	Hundreds	Tens	Ones		Tenths	Hundredths	Thousands
						.			
						.			

- The value of the ..... (increased/decreased) by a factor of **10** from ..... To ..... .
- The value of the ..... (increased/decreased) by a factor of **10** from ..... To ..... .
- The value of the ..... (increased/ decreased) by a factor of **10** from ..... To ..... .

- Therefore, The value of the whole number ..... (increased/decreased) by a factor of **10** from ..... to ..... , **So: 915 ÷ 10 =** ..... .

d 8.7 ÷ 10

The whole number						Decimal Point	Decimals		
Thousands			Ones						
Hundreds	Tens	Ones	Hundreds	Tens	Ones		Tenths	Hundredths	Thousands
						.			
						.			

- The value of the ..... (increased/decreased) by a factor of **10** from ..... To ..... .
- The value of the ..... (increased/decreased) by a factor of **10** from ..... To ..... .
- The value of the ..... (increased/ decreased) by a factor of **10** from ..... To ..... .

- Therefore, The value of the whole number ..... (increased/decreased) by a factor of **10** from ..... to ..... , **So: 8.7 ÷ 10 =** ..... .

2 Find the result:

a 254 X 10 = ...
b 360 ÷ 10 = ...
c 75.65 x 10 = ...
d 83.19 ÷ 10 = ...
e 3.587 X 10 = ...
f 952.4 ÷ 10 = ...

Decomposing Decimal Numbers In expanded form

Learn Extended form is used to decomposing decimals (note the following):

a 0.025 = 0.02 + 0.005

b 0.25 = 0.2 + 0.05

c 4721.7 = 4,000 + 700 + 20 +1 + 0.7

d 472.17 = 400 + 70 + 2 +0.1 + 0.07

e 47.217 = 40 + 7 + 0.2 + 0.01 + 0.007

Note

The decimals can be decomposing in several ways, as in the following example:

3 Find the result:

a 34.527 = ... (1ST. way expanded form)

= ..... . (2nd. Way)

= ..... . (3rd. Way)

b 21.045 = ... (1ST. way expanded form)

= ..... . (2nd. Way)

= ..... . (3rd. Way)

c 14.932 = ... (1ST. way expanded form)

= ..... . (2nd. Way)

= ..... . (3rd. Way)

d 231.128 = ... (1ST. way expanded form)

= ..... . (2nd. Way)

= ..... . (3rd. Way)

e 231.128 = ... (1ST. way expanded form)

= ..... . (2nd. Way)

= ..... . (3rd. Way)

4 Complete the following:

a 200 + 30 + 0.5 + .007 = ...

b 60 + 5 + 0.08 + 0.009 = ...

c 24 + 0.075 = ...

d 65 + 0.7 + 0.02 + 0.009 = ...

e 125 + 0.87 = ...

Assessment on Lessons 3 & 4

First: Choose the correct answer:

1 The value of the number **45.26** is increased by a factor of 10 To ..... .
a 4,526 b 4.526 c 452.6 d 450.26

2 The value of the number ..... is decreased by a factor of 10 To **75.28**
a 752.8 b 7.528 c 750.28 d 75.028

3 400 + 50 + 0.2 + 0.004 = ...
a 450.24 b 450.024 c 450.204 d 45.204

4 20.05= ..... .
a 20 + 5 b 200 + 0.5 c 2 + 0.005 d 20 + 0.05

5 85 ÷10 = ...
a 8.5 b 0.85 c 0.085 d 850

Second: Complete all of the following:

1 The value of the number ..... is increased by a factor of 10 To 39.27

2 The value of the number 270 is decreased by a factor of 10 To ..... .

3 45.012 = 45 + ...

4 500 + 20 + 3 + 0.8 + 0.07 + .006 = ...

5 ..... ÷ 10 = 45.9

Third: Match:

1 78 X 10	a 7.8
2 78 ÷ 10 = ...	b 70.8
3 70 + 0.8 = ...	c 780
4 7 + 0.08 = ...	d 70.08
5 70 + 0.08 = ...	e 7.08

Fourth: Put a mark (✓) or (✗) in front of each statement:

1 The value of any number is increased when dividing by 10 ( )

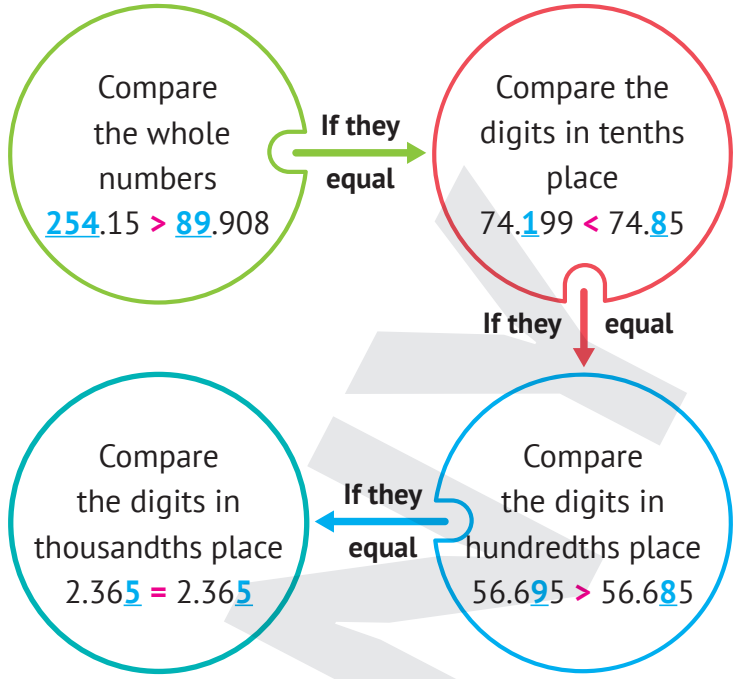
2 85.24 X 10 = 8.524 ( )

3 27.25 = 10 ÷ 2.725 ( )

4 50 + 0.005 = 50.05 ( )

5 200 + 20 + 0.2 + 0.002 = 220.202 ( )

Lesson 5 Comparing Decimals



1 Complete using (<, = or >):

a 45.057 ⬭ 45.100 b 98.013 ⬭ 98.101

c 50.009 ⬭ 50.100 d 10.1 ⬭ 10.011

e 12.01 ⬭ 2.099 f 34.5 ⬭ 34.500

2 Select the largest number:

a 1.401 , 1.341 , 1.440 , 1.041 b 1.055 , 1.3 , 1.28 , 1.045

3 Select the smallest number:

a 20.09 , 20.1 , 20.001 , 20.011 b 9.003 , 3.009 , 30.09 , 90.03

4 Arrange the following numbers in an ascending order :

45.21 , 54.12 , 45.12 , 54.21 , 51.24

The Order: ..... , ... , ... , ... , ...

5 Arrange the following numbers in a descending order :

2.011 , 21.010 , 12.001 , 100.12 , 10.012

The Order: ..... , ... , ... , ... , ...

Lesson 6 Rounding Decimals

Remember

Rounding

It is replacing a number with a simpler number that is close to the original number.

The symbol (≈) is called "approximately equal".

Learn

Rounding Strategies

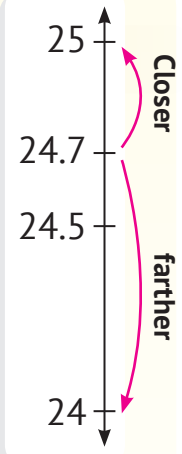
First: **The Midpoint Strategy:**

Example (1): **Round each of the following numbers:**

ⓐ **24.7** (To the nearest whole number)

- The number **24.7** is located between the numbers **24** and **25**
- The midpoint between the two numbers is **24.5** .
- The number **24.7** is closer to the number **25**

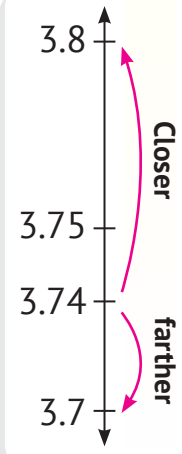
So, 24.7 ≈ 25 (To the nearest whole number)



ⓑ **3.74** (To the nearest tenth)

- The number **3.74** is located between the numbers **3.7** and **3.8**
- The midpoint between the two numbers is **3.75** .
- The number **3.74** is closer to the number **3.7**

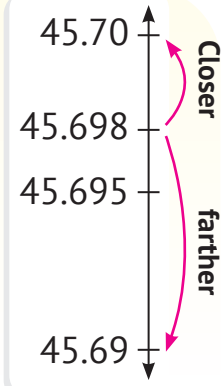
So, 3.74 ≈ 3.7 (To the nearest tenth)



c **45.698** (To the nearest hundredth)

- The number **45.698** is located between the numbers **45.69** and **45.70**
- The midpoint between the two numbers is **45.695** .
- The number **45.698** is closer to the number **45.70**

So, 45.698 ≈ 45.70 (To the nearest hundredth)

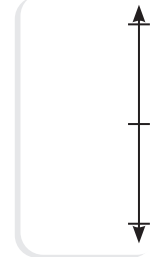


1 **Label the midpoint of the number lines. Place the given decimal number at its proper location and then round to the nearest whole number:**

a 3.258 ≈ ..... .

b 65.8 ≈ ..... .

c 19.67 ≈ ..... .

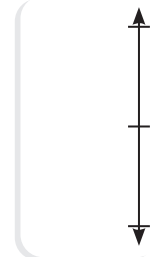


2 **Label the midpoint of the number lines. Place the given decimal number at its proper location and then round to the nearest tenth:**

a 0.65 ≈ ..... .

b 45.54 ≈ ..... .

c 3.992 ≈ ..... .

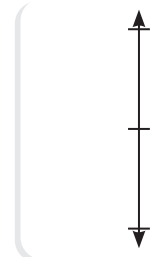


3 **Label the midpoint of the number lines. Place the given decimal number at its proper location and then round to the nearest hundredth:**

a 6.357 ≈ ..... .

b 0.253 ≈ ..... .

c 9.999 ≈ ..... .



Second: Rounding Rule strategy:

1. Select the digit in the place to be rounded.
2. Replace the digits in the places that precede the selected digit with **zeros**.
3. Look at the digit in the place preceding the place to be rounded directly.

If this digit is **0, 1, 2, 3**, or **4**, the number of the specified place remains **unchanged**.

If this digit is **5, 6, 7, 8** or **9**, we **add (1)** to the number of the specified place.

Example (1): Round the following numbers to the nearest:

a +1

5 6 . 8 3 9

5 6 . 8 3 9

56.839 ≈ 56.84

(Hudredths)

b

6 . 2 4

6 . 2 0

6.24 ≈ 6.2

(Tenths)

c +1

9 . 6 7 5

10 . 0 0 0

9.675 ≈ 10

(Whole number)

4 Round each of the following number:

a 753.5 ≈ ..... . (To the nearest whole number)

b 56.25 ≈ ..... . (To the nearest tenth)

c 63.78 ≈ ..... . (To the nearest ten)

d 782.475 ≈ ..... . (To the nearest hundredth)

e 956.285 ≈ ..... . (To the nearest hundred)

5 Fill in the chart as you round each decimal to the stated place value:

	Number	Round to the nearest whole number	Round to the nearest Tenth	Round to the nearest Hundredth
a	56 . 284	.....	.....	.....
b	572.089	.....	.....	.....
c	0.896	.....	.....	.....

Assessment on Lessons 5 & 6

First: Choose the correct answer:

1 45 + 0.5 ..... 450 + 0.05

(a) < (b) > (c) = (d) ⩽

2 ..... ≈ 75.3 **(To the nearest tenth)**

(a) 75.03 (b) 75.39 (c) 750.3 (d) 75.34

3 78.098 ≈ ..... . **(To the nearest whole number)**

(a) 78.1 (b) 78 (c) 79 (d) 7

4 68.567 ≈ 68.57 **(To the nearest .....)**

(a) whole number (b) tenth (c) hundredth (d) thousandth

5 ..... ≈ 20.02 **(To the nearest hundredth)**

(a) 20.002 (b) 20.024 (c) 0.025 (d) 20.200

Second: Complete all of the following:

1 458.025 ≈ ..... . **(To the nearest hundredth)**

2 458.025 ≈ ..... . **(To the nearest tenth)**

3 458.025 ≈ ..... . **(To the nearest whole number)**

4 458.025 ≈ ..... . **(To the nearest ten)**

5 458.025 ≈ ..... . **(To the nearest hundred)**

Third: Complete using (<, = or >):

1 40.02 ..... 400 + 2

2 50.600 ..... 5.006

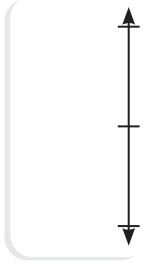
3 500 + 90 + 3 + 0.8 + 0.07 ..... 593.87

4 300.03 ..... Three hundred and three tenths

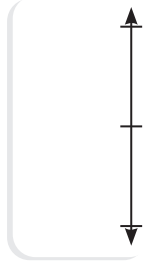
5 25 + 0.03 + 0.008 ..... Twenty five and eighty three hundredths.

Fourth: Label the midpoint of the number lines. Place the given decimal number at its proper location and then round:

1 65.25 ≈ ..... .



2 80.958 ≈ ..... .



3 2.875 ≈ ..... .