

MODULE 6

Decimals in Real-Life

The average temperature for the month of April was 17.6°C .
The average temperature for the month of June was 27.8°C .
How many degrees hotter was it in June than in April?

PART 1

Tenths

Scott ran the 100-yard dash in 10.3 seconds. What is the value of the 3?
You can use a place value chart to help you read and write numbers.

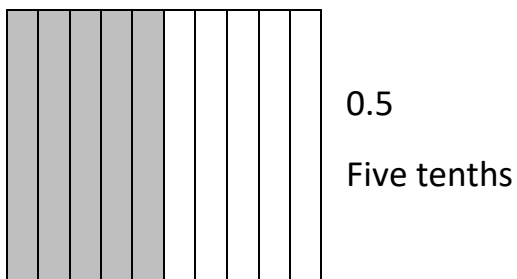
Tens	Ones	Decimal	Tenths
1	0	.	3

The numbers to the left of the decimal point are whole numbers. The numbers to the right of the decimal point are parts of the whole, or decimals.

You can use a decimal when a whole is divided into 10 equal parts. One **tenth** is written 0.1.

In the number 10.3, the value of the 3 is three tenths. You read the decimal as **ten and three tenths**.

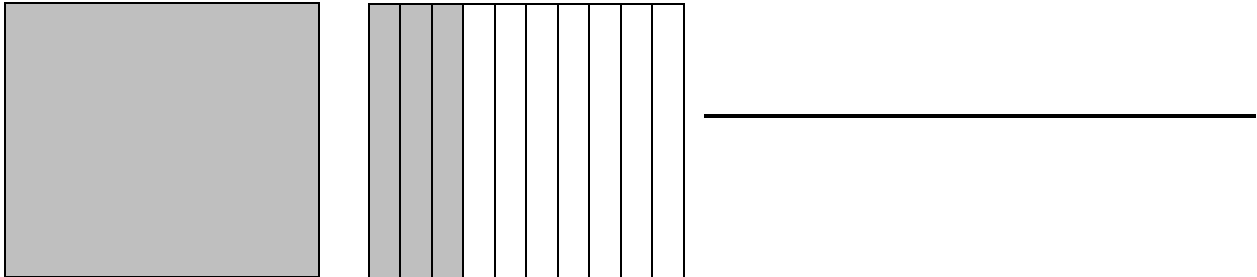
Example: Write the decimal and word name for the shaded part.



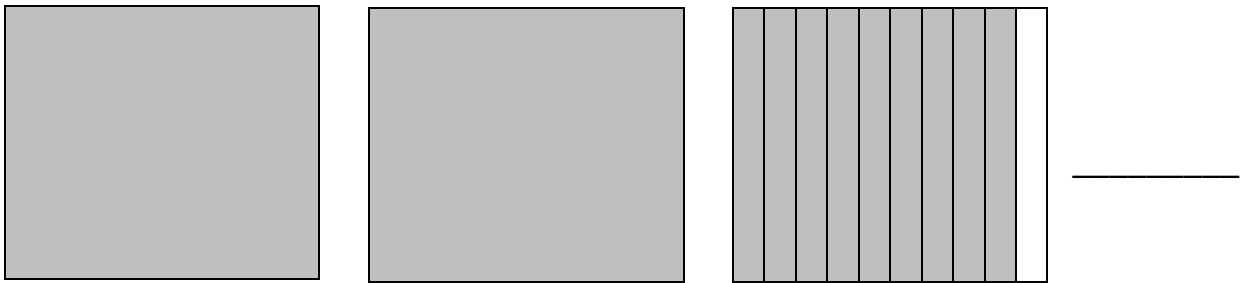
Exercise 1-A

Write the decimal for the shaded part.

1.



2.



Exercise 1-B

Write the number in words.

3. 4.1 _____

4. 0.2 _____

5. 18.5 _____

6. 3.7 _____

Exercise 1-C

Write the decimal.

7. eight tenths _____

8. Four tenths _____

9. six tenths _____

10. One tenth _____

11. 6 and 2 tenths _____

12. 9 and 6 tenths _____

13. 20 and 5 tenths _____

14. 32 and 1 tenth _____

15. fifty and three tenths _____

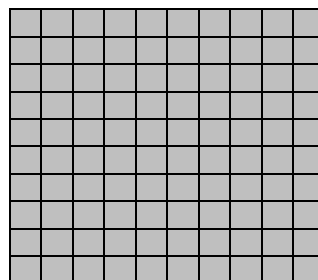
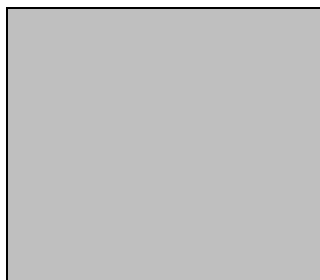
16. 23 and 6 tenths _____

PART 2

Hundredths

Adrienne walked 2.45 kilometers on Tuesday. She uses a pedometer to measure the distance she walks every day. A pedometer measures the distance in **hundredths** of a kilometer.

You can use a decimal when a whole is divided into 100 equal parts. One **hundredth** is written 0.01.

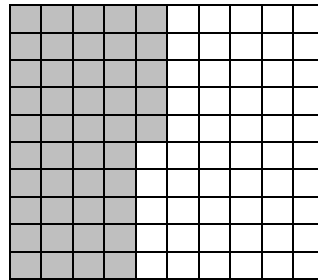
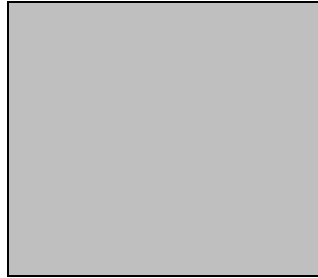


1 one

=

100 hundredths

The shaded part of the place value models below shows how far Adrienne walked.

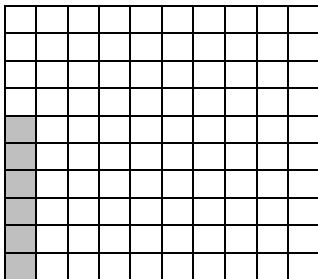


Ones	Decimal	Tenths	Hundredths
2	.	4	5

2 and 45 hundredths are shaded.

It is read as two and forty five hundredths.

Example: How many hundredths are shaded? Write the decimal.



Ones	Decimals	Tenths	Hundredths
0	.	0	6

6 hundredths are shaded.

The decimal is written as 0.06.

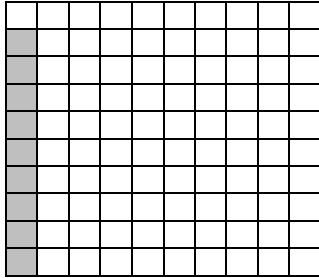
It is read six hundredths.

Look at the place value chart. Why is there a zero in the tenths column?

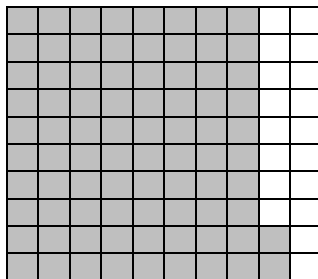
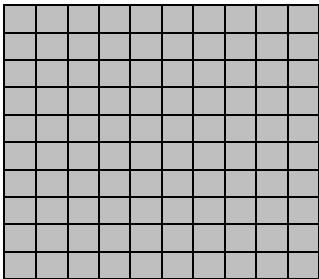
Exercise 2-A

Write the decimal for the shaded part.

1.



2.



Exercise 2-B

Write the number in words.

3. 0.07 _____

4. 1.34 _____

5. 7.19 _____

6. 15.86 _____

Exercise 2-C

Write the decimal.

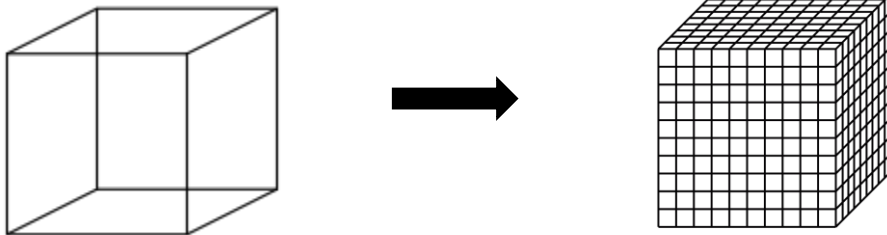
7. 63 hundredths _____
8. two hundredths _____
9. 89 hundredths _____
10. 15 and 3 hundredths _____
11. 9 and 6 hundredths _____
12. 2 ones, 1 tenth and 2 hundredths _____
13. 5 ones, 1 tenth and 2 hundredths _____
14. 6 ones and 9 hundredths _____
15. 6 tens and 6 tenths _____

PART 3

Thousandths

Baseballs players' batting averages are given to the nearest **thousandth**.

You can use a decimal when a whole is divided into 1,000 equal parts. One thousandth is written 0.001.



Use the place value chart to help you read the numbers.

Tens	Ones	Decimal	Tenths	Hundredths	thousandths
	0	.	3	4	8
	1	.	6	2	4
1	5	.	0	0	7

In the number 0.348, the 8 is in the thousandths place.
Its value is 8 thousandths.
It is read *three hundred forty- eight thousandths*.

In the number 1.624, the 4 is in the thousandths place.
Its value is 4 thousandths.
It is read one and *six hundred twenty-four thousandths*.

In the number 15.007, the 7 is in the thousandths place.
Its value is 7 thousandths.
It is read *fifteen and seven thousandths*.

Exercise 3-A

Write the number in words.

1. 0.003 _____

2. 1.107 _____

3. 12.349 _____

Exercise 3-B

Write the number.

4. 324 thousandths _____ 5. 3 and 41 thousandths _____
6. 5 and 341 thousandths _____ 7. 41 and 8 thousandths _____

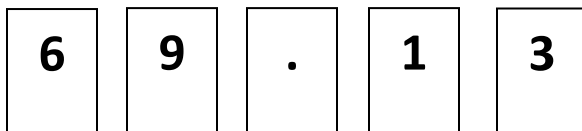
Exercise 3-C

In the number **32.174** what digit is in the:

8. Tens place? _____ 9. Hundredths place? _____
10. Tenths place? _____ 11. Thousandths place? _____

Critical Thinking

Use the cards below to solve.



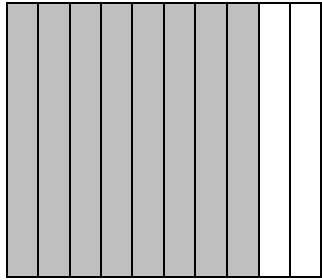
12. Write two decimals with a 1 in the thousandths place and a 3 in the tenths place.

13. Write all the decimals you can make with a 6 in the ones place and a 9 in the thousandths place.

PART 4

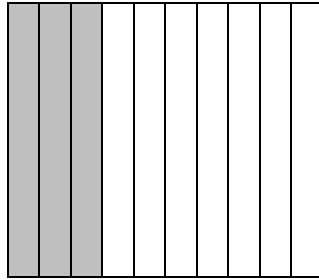
Comparing and Ordering Decimals

Comparing decimals is the same as comparing whole numbers. Start at the left and compare the digits.

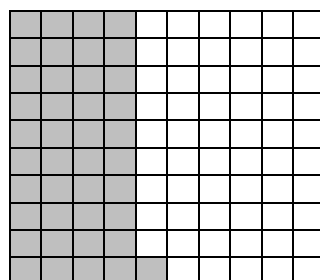


0.8

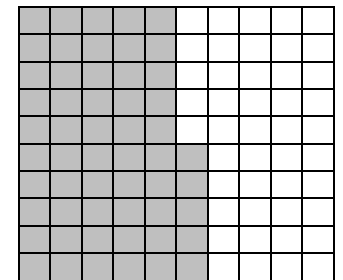
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0.3



0.41

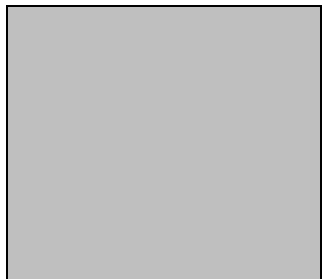


<

0.55

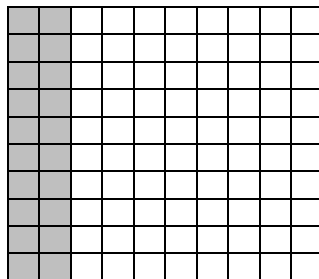
Example: Compare 1.2 and 1.27

To compare, write a zero after the 1.2. The value stays the same.



1.2

=



1.20



1.27

Look at the shaded squares.

$1.20 < 1.27$

$1.2 < 1.27$

You can compare numbers mentally.

1.62 1.79 1.99

1.62 < 1.79 < 1.99

These numbers are in order from least to greatest.

Exercise 4-A

Write $<$, $>$, or $=$ to compare the decimals.

1. $0.2 \underline{\hspace{1cm}} 0.8$

2. $0.4 \underline{\hspace{1cm}} 0.5$

3. $0.6 \underline{\hspace{1cm}} 6.0$

4. $0.22 \underline{\hspace{1cm}} 0.17$

5. $0.30 \underline{\hspace{1cm}} 0.10$

6. $0.134 \underline{\hspace{1cm}} 0.137$

7. $4.11 \underline{\hspace{1cm}} 4.13$

8. $2.07 \underline{\hspace{1cm}} 2.070$

9. $3.12 \underline{\hspace{1cm}} 3.012$

10. $2.70 \underline{\hspace{1cm}} 2.71$

11. $3.169 \underline{\hspace{1cm}} 3.147$

12. $0.75 \underline{\hspace{1cm}} 0.750$

Exercise 4-B

Order From Least To Greatest

13. $0.7, 0.2, 1.7$ _____

14. $0.27, 0.35, 0.16$ _____

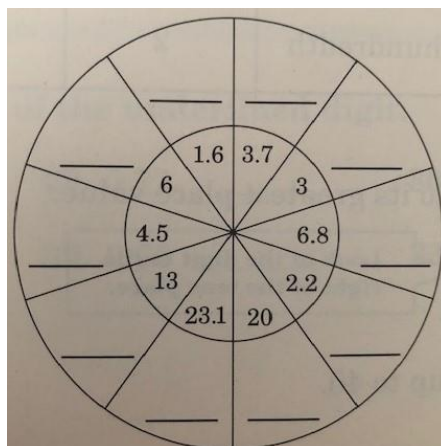
15. $3.3, 3.33, 3.303$ _____

16. $4.10, 4.01, 4.011, 4.101$ _____

17. $0.34, 0.43, 0.52, 0.32$ _____

Mental Math

Use mental math. Write each number as a hundredths decimal.



PART 5

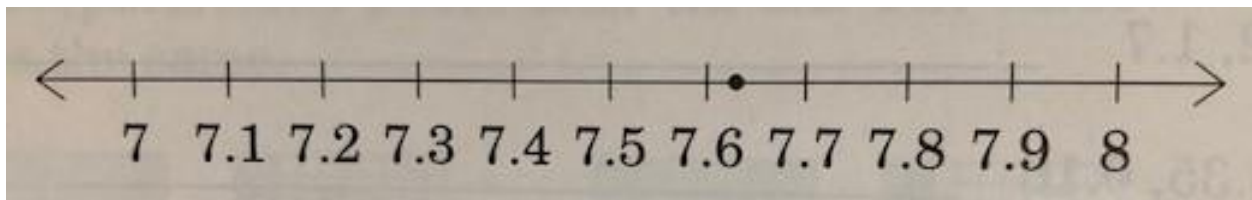
Rounding Decimals

The quarterback of the football team averaged 7.64 yards per pass last season. You can round the decimal if you do not need to know the exact answer.

Rounding decimals is the same as rounding whole numbers. Look at the digit to the right of the place to be rounded.

Round down when the digit is 0,1,2,3, or 4.

Round up when the digit is 5, 6, 7, 8, or 9.



7.64 rounded to the nearest whole number is 8.

7.64 rounded the nearest tenth is 7.6.

Example:

Number	Round to the nearest	Digit to the right	Is it 5 or more?	Round
46.59	Whole number	5	Yes	Up to 47
13.71	Tenth	1	No	Down to 13.7
3.802	Hundredth	2	No	Down to 3.80

Example: Round 35.87 to its greatest place value.

35.87

Look at the digit to the right of the tens place

Round 35.87 up to 40

Exercise 5-A**Round to the nearest whole number.**

1. 3.2 _____

2. 6.7 _____

3. 3.85 _____

4. 6.75 _____

5. 33.21 _____

6. 27.52 _____

7. 39.07 _____

8. 42.51 _____

9. 82.17 _____

Exercise 5-B**Round to the nearest tenth.**

10. 3.32 _____

11. 4.73 _____

12. 6.88 _____

13. 9.07 _____

14. 34.12 _____

15. 16.86 _____

16. 43.94 _____

17. 21.11 _____

18. 64.58 _____

Exercise 5-C**Round to the greatest place value.**

19. 3.3 _____

20. 37.4 _____

21. 22.8 _____

22. 8.57 _____

23. 41.89 _____

24. 39.10 _____

25. 27.3 _____

26. 4.52 _____

27. 16.18 _____

Exercise 5-D**Round to the place of the underlined digit.**

28. 16.4 _____

29. 3.72 _____

30. 16.94 _____

31. 113.26 _____

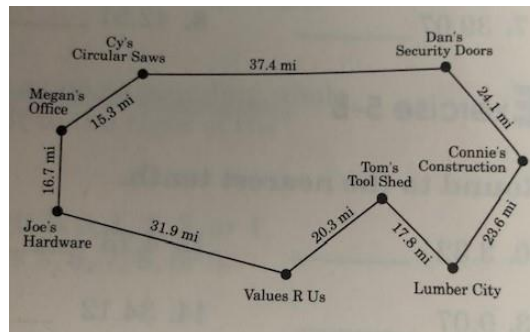
32. 0.75 _____

33. 100.12 _____

PART 6

Problem solving strategy: Estimating with Decimals.

Megan is a salesperson for a tool company. She plans on leaving her office and making sales calls today. She visits CY's Circular Saws and Dan's security doors in the morning. About how many miles will she travel?



Sometimes you do not need an exact answer. You can estimate to solve a problem.

Use the map above to solve the problem. To estimate how many miles Megan traveled, round each number to the greatest place value.

$$\begin{array}{r} 15.3 \\ + 37.4 \\ \hline \end{array} \quad \longrightarrow \quad \begin{array}{r} 20 \\ + 40 \\ \hline 60 \end{array}$$

Megan traveled about 60 miles.

Example: In the afternoon, Megan traveled from Dan's Security Doors to Connie's Construction and Lumber City. About how many miles did she travel in the afternoon?

$$\begin{array}{r} 24.1 \\ + 23.6 \\ \hline \end{array} \quad \longrightarrow \quad \begin{array}{r} 20 \\ + 20 \\ \hline 40 \end{array}$$

Exercise 6 –A
Estimate to solve

1. Megan spent \$8.93 on gasoline in the morning. She spent \$4.23 on gasoline in the afternoon. About how much money did she spend on gasoline?
-

2. Rob is making a fruit basket. He wants to buy 6 pounds of fruit. He gets 1.37 pounds of grapes, 2.73 pounds of apples, and 1.99 pounds of oranges Does he have enough fruit?
-

3. Jessica made \$276.57 in commissions this week. Peter made \$124.75. About how much more did Jessica make than Peter?
-

4. Megan drove 100.4 kilometers the first day of her business trip. The second day, she drove 86.7 kilometers. About how many more kilometers did she drive the first day?
-

5. Juan buys a novel for \$27.23 and a bookmark for \$2.19. About how much did he spend in all?
-

6. Brian ordered cement at Connie’s Construction. It was delivered in two shipments. The first shipment was 75.7 pounds. The second shipment was 175.8 pounds. About how many pounds of cement did Brian order?
-

PART 7

Adding Decimals

Karen runs 1.35 miles on Monday and 4.19 miles on Tuesday. How many miles does she run in all?

To find out, add 1.35 and 4.19. When you add decimals, it is very important to keep decimal points in line.

$$\begin{array}{r} 1.35 \\ + 4.19 \\ \hline \end{array} \quad \longrightarrow \quad \begin{array}{r} 1 \\ 1.35 \\ + 4.19 \\ \hline 5.54 \end{array}$$

Step One: Line up the decimal points.

Step Two: Add the hundredths. Regroup if necessary.

Step Three: Add the tenths. Regroup if necessary.

Step Four: Add the ones.

Karen ran 5.54 miles.

Sometimes each decimal does not have the same number of places. When this happens, add a zero after the last digit of a decimal. Remember, writing a zero as a placeholder does not change its value.

Example: Add: $8.35 + 2.7$

$$\begin{array}{r} 8.35 \\ + 2.7 \\ \hline \end{array} \quad \longrightarrow \quad \begin{array}{r} 8.35 \\ + 2.70 \\ \hline 11.05 \end{array}$$

Calculating

When you use a calculator to add decimals, you do not need to add the zero as a placeholder.

Add: $37.7 + 3.58$

Press: $37.7 + 3.58 = 41.28$

Exercise 7–A
Add.

- | | | | | | | | |
|-----|----------------------------------------------------------|-----|----------------------------------------------------------|-----|----------------------------------------------------------|-----|----------------------------------------------------------|
| 1. | $\begin{array}{r} 3.7 \\ +2.1 \\ \hline \end{array}$ | 2. | $\begin{array}{r} 4.9 \\ +2.6 \\ \hline \end{array}$ | 3. | $\begin{array}{r} 8.92 \\ +3.87 \\ \hline \end{array}$ | 4. | $\begin{array}{r} 6.39 \\ +4.87 \\ \hline \end{array}$ |
| 5. | $\begin{array}{r} 13.63 \\ +3.09 \\ \hline \end{array}$ | 6. | $\begin{array}{r} 16.35 \\ +4.89 \\ \hline \end{array}$ | 7. | $\begin{array}{r} 83.09 \\ +2.17 \\ \hline \end{array}$ | 8. | $\begin{array}{r} 19.08 \\ +42.71 \\ \hline \end{array}$ |
| 9. | $\begin{array}{r} 33.7 \\ +34.9 \\ \hline \end{array}$ | 10. | $\begin{array}{r} 13.84 \\ +1.76 \\ \hline \end{array}$ | 11. | $\begin{array}{r} 85.37 \\ +3.83 \\ \hline \end{array}$ | 12. | $\begin{array}{r} 3.87 \\ +50.38 \\ \hline \end{array}$ |
| 13. | $\begin{array}{r} 6.39 \\ +17.38 \\ \hline \end{array}$ | 14. | $\begin{array}{r} 43.89 \\ +12.63 \\ \hline \end{array}$ | 15. | $\begin{array}{r} 8.99 \\ +13.47 \\ \hline \end{array}$ | 16. | $\begin{array}{r} 15.99 \\ +13.17 \\ \hline \end{array}$ |
| 17. | $\begin{array}{r} 89.60 \\ +13.89 \\ \hline \end{array}$ | 18. | $\begin{array}{r} 52.89 \\ +18.80 \\ \hline \end{array}$ | 19. | $\begin{array}{r} 13.42 \\ +63.89 \\ \hline \end{array}$ | 20. | $\begin{array}{r} 33.89 \\ +14.63 \\ \hline \end{array}$ |
| 21. | $\begin{array}{r} 9.92 \\ +13.82 \\ \hline \end{array}$ | 22. | $\begin{array}{r} 16.39 \\ +14.81 \\ \hline \end{array}$ | 23. | $\begin{array}{r} 52.17 \\ +1.89 \\ \hline \end{array}$ | 24. | $\begin{array}{r} 33.17 \\ +23.89 \\ \hline \end{array}$ |

Exercise 7–B
Add.

$$25. \quad \begin{array}{r} 16.5 \\ + 3 \\ \hline \end{array}$$

$$26. \quad \begin{array}{r} 8.92 \\ + 1.7 \\ \hline \end{array}$$

$$27. \quad \begin{array}{r} 3.7 \\ + 3.89 \\ \hline \end{array}$$

$$28. \quad \begin{array}{r} 32.7 \\ + 14.38 \\ \hline \end{array}$$

$$29. \quad \begin{array}{r} 0.72 \\ + 3.1 \\ \hline \end{array}$$

$$30. \quad \begin{array}{r} 8 \\ + 2.33 \\ \hline \end{array}$$

$$31. \quad \begin{array}{r} 14.1 \\ + 0.87 \\ \hline \end{array}$$

$$32. \quad \begin{array}{r} 33.9 \\ + 2.89 \\ \hline \end{array}$$

$$33. \quad \begin{array}{r} 14.63 \\ + 3.8 \\ \hline \end{array}$$

$$34. \quad \begin{array}{r} 9.75 \\ + 4.1 \\ \hline \end{array}$$

$$35. \quad \begin{array}{r} 93.16 \\ + 2.8 \\ \hline \end{array}$$

$$36. \quad \begin{array}{r} 5.9 \\ + 7.87 \\ \hline \end{array}$$

$$37. \quad \begin{array}{r} 44.89 \\ + 37.2 \\ \hline \end{array}$$

$$38. \quad \begin{array}{r} 16.7 \\ + 8.93 \\ \hline \end{array}$$

$$39. \quad \begin{array}{r} 13.63 \\ + 3.4 \\ \hline \end{array}$$

$$40. \quad \begin{array}{r} 58.7 \\ + 8.53 \\ \hline \end{array}$$

$$41. \quad \begin{array}{r} 22.7 \\ + 13.97 \\ \hline \end{array}$$

$$42. \quad \begin{array}{r} 6.72 \\ + 43.8 \\ \hline \end{array}$$

$$43. \quad \begin{array}{r} 13.98 \\ + 3.4 \\ \hline \end{array}$$

$$44. \quad \begin{array}{r} 2.8 \\ + 3.72 \\ \hline \end{array}$$

Exercise 7–C**Solve**

45. Mike has \$10. He wants to buy a roll of film for \$ 3.79 and batteries for \$5.20. Does he have enough money?

46. Rose rides her bicycle for 6.8 kilometers on Saturday and 3.75 kilometers on Sunday.

How many kilometers does she ride in all?

PART 8

Subtracting Decimals

The high temperature on Friday was 88.7°F. The high temperature on Saturday was 90.3°F. How much lower was the temperature on Friday?

To find out, subtract 88.7 from 90.3.

$$\begin{array}{r} 90.3 \\ - 88.7 \\ \hline 1.6 \end{array}$$

Line up the decimal points.

Step one: Line up the decimal points.

Step two: Subtract the tenths. Regroup

Step Three: Subtract the ones. Regroup

Step Four: Subtract the tens.

The temperature was 1.6°F lower on Friday.

Sometimes when you subtract decimals, each decimal does not have the same number of places. When this happens, add zeros as placeholders. Remember, adding a zero after the last digit of a decimal does not change its value.

Example: Subtract 4.75 from 9.2.

$$\begin{array}{r} 9.2 \\ - 4.75 \\ \hline 4.45 \end{array}$$

Add a zero.

Example: Subtracting 6.39 from 42.

$$\begin{array}{r} 42 \\ - 6.39 \\ \hline \end{array} \quad \begin{array}{r} 42.00 \\ - 6.39 \\ \hline \end{array} \quad \begin{array}{r} 42.00 \\ - 6.39 \\ \hline 35.61 \end{array}$$

Step One: Line up the Decimal points.

Step Two: Add a zero ion the tenths place and hundredths place.

Step Three: Subtract the hundredths. Regroup

Step Four: Subtract the tenths. Regroup

Step Five: Subtract the ones. Regroup.

Step Six: Subtract the tens.

Exercise 8-A

Subtract.

$$\begin{array}{r} 1. \quad 0.8 \\ - 0.2 \\ \hline \end{array} \quad \begin{array}{r} 2. \quad 6.3 \\ - 4.1 \\ \hline \end{array} \quad \begin{array}{r} 3. \quad 5.8 \\ - 2.9 \\ \hline \end{array} \quad \begin{array}{r} 4. \quad 9.3 \\ - 4.2 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 16.7 \\ - 2.7 \\ \hline \end{array} \quad \begin{array}{r} 6. \quad 42.8 \\ - 3.4 \\ \hline \end{array} \quad \begin{array}{r} 7. \quad 36.8 \\ - 13.3 \\ \hline \end{array} \quad \begin{array}{r} 8. \quad 9.4 \\ - 2.2 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 33.1 \\ - 16.7 \\ \hline \end{array} \quad \begin{array}{r} 10. \quad 42.4 \\ - 6.8 \\ \hline \end{array} \quad \begin{array}{r} 11. \quad 52.5 \\ - 13.6 \\ \hline \end{array} \quad \begin{array}{r} 12. \quad 68.7 \\ - 13.9 \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad 4.38 \\ - 2.72 \\ \hline \end{array} \quad \begin{array}{r} 14. \quad 8.74 \\ - 3.89 \\ \hline \end{array} \quad \begin{array}{r} 15. \quad 37.84 \\ - 16.43 \\ \hline \end{array} \quad \begin{array}{r} 16. \quad 89.31 \\ - 43.87 \\ \hline \end{array}$$

Exercise 8 –B
Subtract.

17.	$\begin{array}{r} 3.6 \\ - 1 \\ \hline \end{array}$	18.	$\begin{array}{r} 8.39 \\ - 3.2 \\ \hline \end{array}$	19.	$\begin{array}{r} 7.84 \\ - 2.4 \\ \hline \end{array}$	20.	$\begin{array}{r} 13.53 \\ - 7 \\ \hline \end{array}$
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21.	$\begin{array}{r} 8 \\ - 3.7 \\ \hline \end{array}$	22.	$\begin{array}{r} 7.8 \\ - 3.92 \\ \hline \end{array}$	23.	$\begin{array}{r} 0.7 \\ - 0.42 \\ \hline \end{array}$	24.	$\begin{array}{r} 0.9 \\ - 0.36 \\ \hline \end{array}$
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25.	$\begin{array}{r} 82.2 \\ - 8.95 \\ \hline \end{array}$	26.	$\begin{array}{r} 16 \\ - 4.81 \\ \hline \end{array}$	27.	$\begin{array}{r} 36.7 \\ - 22.72 \\ \hline \end{array}$	28.	$\begin{array}{r} 43 \\ - 8.73 \\ \hline \end{array}$
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29.	$\begin{array}{r} 74.3 \\ - 13.91 \\ \hline \end{array}$	30.	$\begin{array}{r} 62.6 \\ - 43.74 \\ \hline \end{array}$	31.	$\begin{array}{r} 89.3 \\ - 7.54 \\ \hline \end{array}$	32.	$\begin{array}{r} 52.9 \\ - 1.79 \\ \hline \end{array}$
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Exercise 8 –C
Solve.

33. Janice has a \$5 bill. She spends \$1.89 at the card shop. How much change does she receive?

34. Daniel spends \$89.50 on groceries and \$29.43 on records. How much more does he spend on groceries than on records?

Calculating

Use a calculator to find the differences.

35. $8 - 3.2$ _____

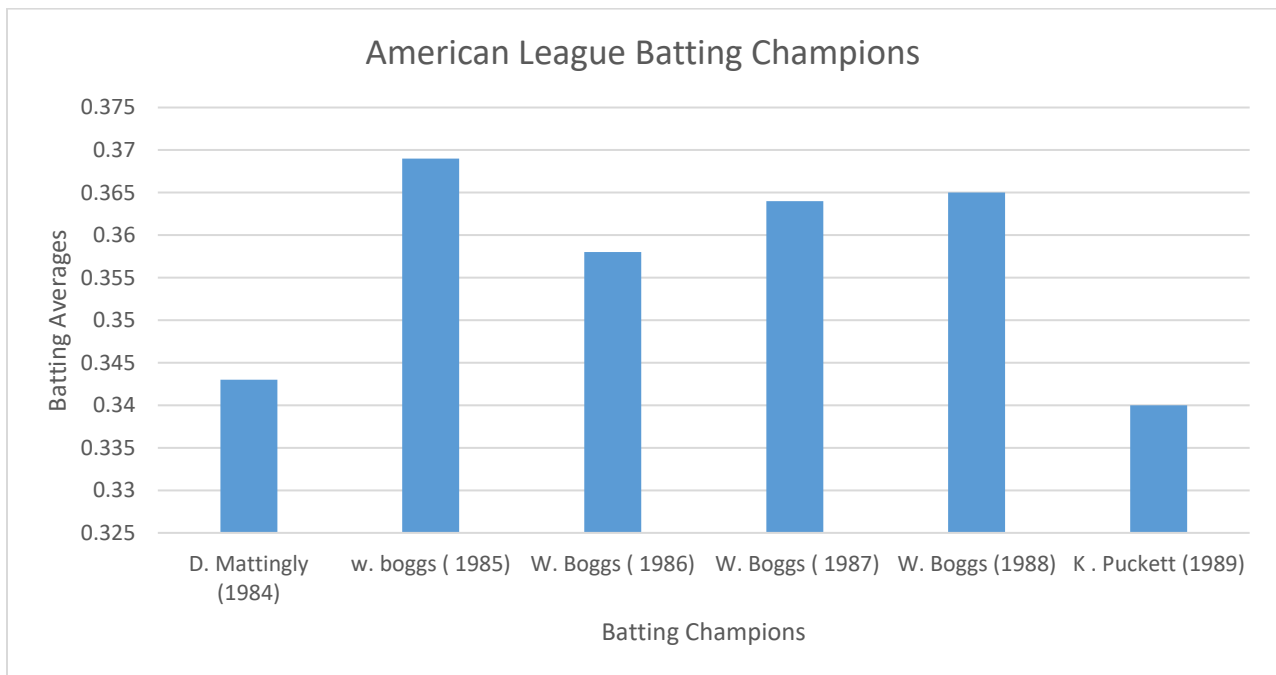
36. $9 - 4.1$ _____

37. $\$6 - \2.89 _____

Application

Batting Averages

Baseball players keep track of their batting performance with a **batting average**. A batting average is a record of the number of hits and the number of times at bat. This average is written as a decimal to the thousandths place.



Use the graph to answer the questions.

1. Who had a higher batting average, Kirby Puckett or Don Mattingly?
2. In which year did Wage Boggs have the highest batting average?
3. How much higher was Wade Boggs` batting average in 1988 than 1987?
4. Which player had the highest batting average?

Module 6: Decimals in Real-Life

Review 1

Write the number in words.

- 0.7 _____
- 4.32 _____
- 48.007 _____

Write the decimal.

- 9 and 3 tenths _____
- 4 and 9 hundredths _____
- 3 and 8 thousandths _____
- Thirty-one thousandths _____

Compare

- 0.7 _____ 0.4
- 4.17 _____ 4.017
- 0.85 _____ 0.085
- 4.123 _____ 4.321
- 0.70 _____ 0.10
- 13.824 _____ 13.249

Round to the greatest place value.

- 4.5 _____
- 63.9 _____
- 2.8 _____
- 16.7 _____
- 43.84 _____
- 16.17 _____

Add or subtract.

- $$\begin{array}{r} 6.3 \\ +2.4 \\ \hline \end{array}$$
- $$\begin{array}{r} 8.9 \\ +3.7 \\ \hline \end{array}$$
- $$\begin{array}{r} 4.1 \\ +3.79 \\ \hline \end{array}$$
- $$\begin{array}{r} 3.9 \\ +4.81 \\ \hline \end{array}$$
- $$\begin{array}{r} 6.9 \\ -2.5 \\ \hline \end{array}$$
- $$\begin{array}{r} 8.7 \\ -2.9 \\ \hline \end{array}$$
- $$\begin{array}{r} 32.1 \\ -5.63 \\ \hline \end{array}$$
- $$\begin{array}{r} 42 \\ -3.89 \\ \hline \end{array}$$

PART 9

Multiplying & Dividing Decimals

Multiplying Decimals by Whole Numbers

When you multiply a decimal by a whole number, the product will have the same number of decimal places as the decimal.

Example: Multiply 2.34×2 .

Multiply decimals as you do whole numbers.

$$\begin{array}{r} 2.34 \\ \times 2 \\ \hline \end{array} \qquad \begin{array}{r} 2.34 \\ \times 2 \\ \hline 4.68 \end{array}$$

Two decimal places. Two decimal places.

Step One: Multiply 4 hundredths by 2.

Step Two: Multiply 3 tenths by 2.

Step Three: Multiply 2 ones by 2.

$$2.34 \times 2 = 4.68$$

Multiplication can be thought of as repeated addition.

$$\begin{array}{r} 2.34 \\ \times 2 \\ \hline 4.68 \end{array} \qquad \begin{array}{r} 2.34 \\ + 2.34 \\ \hline 4.68 \end{array}$$

Sometimes when you multiply decimals by a whole number, you need to regroup.

Example: Multiply 32.85×7 .

Step One

$$\begin{array}{r} 32.85 \\ \times 7 \\ \hline 22995 \end{array}$$

Step Two

$$\begin{array}{r} 32.85 \\ \times 7 \\ \hline 22995 \end{array}$$

Step Three

$$\begin{array}{r} 32.85 \\ \times 7 \\ \hline 229.95 \end{array}$$

Two decimal places Two decimal places

Step One: Multiply as you would with whole numbers.

Step Two: Count the decimal places.

Step Three: Write the decimal point in the product.

Example: The Sock Hop was having a clearance sale. Maggie bought 32 pairs of socks for \$1.89 each. How much did she spend at the sale?

To find out, multiply.

$\begin{array}{r} \$1.89 \\ \times 32 \\ \hline 378 \\ 567 \\ \hline 6048 \end{array}$	$\begin{array}{r} \$1.89 \\ \times 32 \\ \hline 378 \\ 567 \\ \hline \$60.48 \end{array}$	→ Two Decimal places
		→ Two Decimal places

Example: Multiply 38.427 by 3.

$\begin{array}{r} 38.427 \\ 38.427 \\ + 38.427 \\ \hline 115.281 \end{array}$	$\begin{array}{r} 38.427 \\ \times 3 \\ \hline 115.281 \end{array}$	→ Three Decimal places
		→ Three Decimal Places.

Exercise 9 – A Multiply

1.
$$\begin{array}{r} 0.36 \\ \times 4 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 0.74 \\ \times 9 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 0.82 \\ \times 6 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 3.8 \\ \times 5 \\ \hline \end{array}$$

5.
$$\begin{array}{r} 734.2 \\ \times 3 \\ \hline \end{array}$$

6.
$$\begin{array}{r} 89.43 \\ \times 7 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 12.8 \\ \times 24 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 73.89 \\ \times 17 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 89.7 \\ \times 42 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad \$41.44 \\ \times 89 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 9.189 \\ \times 407 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 8.274 \\ \times 209 \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad 22.94 \\ \times 821 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad \$62.17 \\ \times 75 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 6.127 \\ \times 387 \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad 9.194 \\ \times 217 \\ \hline \end{array}$$

$$\begin{array}{r} 17. \quad 5.812 \\ \times 319 \\ \hline \end{array}$$

$$\begin{array}{r} 18. \quad 43.82 \\ \times 15 \\ \hline \end{array}$$

$$\begin{array}{r} 19. \quad \$16.89 \\ \times 425 \\ \hline \end{array}$$

$$\begin{array}{r} 20. \quad 62.3 \\ \times 143 \\ \hline \end{array}$$

Exercise 9 – B

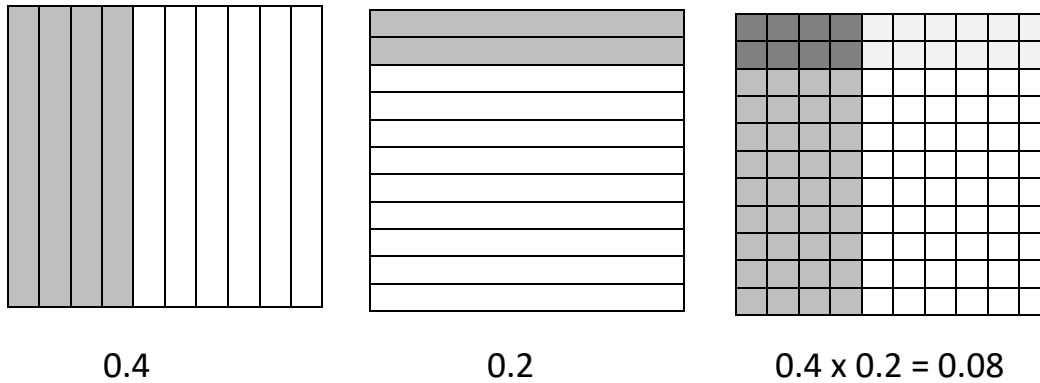
Solve

21. The scout troop sold 457 boxes of cookies. Each box sells for \$2.25. How much money did they make from the cookie sale?

22. Marisa bought her grandson 3 books. The price of each book was \$ 10.95. How much did she spend in all?

PART 10
Multiplying Decimals

You can use decimal models to show what happens when you multiply decimals. This model shows 0.4×0.2 .



When you multiply tenths by tenths. The product is in hundredths.

Look at the hundredths model above. The shaded area that overlaps four tenths and two tenths is the product, or 8 hundredths.

When you multiply hundredths by tenths, the product is in thousandths.

Example: Multiply 3.82×2.7 .

$$\begin{array}{r} 3.82 \\ \times 2.7 \\ \hline 10.314 \end{array}$$

In general, if you add the number of decimal places in each factor, you will get the number of decimal places in the product.

$$\begin{array}{r} 3.82 \longrightarrow \text{Two Decimal Places} \\ \times 4 \longrightarrow \text{Zero Decimal Places} \\ \hline 15.28 \longrightarrow \text{Two Decimal Places} \end{array}$$

$$\begin{array}{r} 61.8 \longrightarrow \text{One Decimal Places} \\ \times 0.67 \longrightarrow \text{Two Decimal Places} \\ \hline 41.406 \longrightarrow \text{Three Decimal Places} \end{array}$$

Exercise 10 – A
Multiply

1.
$$\begin{array}{r} 0.7 \\ \times 0.8 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 0.5 \\ \times 0.9 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 0.36 \\ \times 0.7 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 0.83 \\ \times 0.5 \\ \hline \end{array}$$

5.
$$\begin{array}{r} 12.7 \\ \times 0.9 \\ \hline \end{array}$$

6.
$$\begin{array}{r} 0.309 \\ \times 2.2 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 3.9 \\ \times 0.2 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 0.412 \\ \times 2.7 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 13.413 \\ \times 3.9 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 27.2 \\ \times 8.9 \\ \hline \end{array}$$

11.
$$\begin{array}{r} 14.189 \\ \times 6.7 \\ \hline \end{array}$$

12.
$$\begin{array}{r} 0.7 \\ \times 148.3 \\ \hline \end{array}$$

13.
$$\begin{array}{r} 2.62 \\ \times 142.8 \\ \hline \end{array}$$

14.
$$\begin{array}{r} 2.714 \\ \times 23.9 \\ \hline \end{array}$$

15.
$$\begin{array}{r} 12.7 \\ \times 3.6 \\ \hline \end{array}$$

16.
$$\begin{array}{r} 4.176 \\ \times 0.32 \\ \hline \end{array}$$

17.
$$\begin{array}{r} 31.19 \\ \times 0.72 \\ \hline \end{array}$$

18.
$$\begin{array}{r} 13.8 \\ \times 147.9 \\ \hline \end{array}$$

19.
$$\begin{array}{r} 18.73 \\ \times 20.1 \\ \hline \end{array}$$

20.
$$\begin{array}{r} 0.9 \\ \times 42.8 \\ \hline \end{array}$$

Exercise 10 – B

Use a calculator and multiply

21. $33.7 \times 41.9 \times 3.7$ _____

22. $1.7 \times 82.3 \times 4.175$ _____

PART 11

Dividing Decimals by Whole Numbers

Dividing decimals by whole numbers is the same as dividing whole numbers. However, you must remember to write a decimal point in the quotient.

Example: Divide $9 \overline{)13.5}$

Step One	Step Two
$\begin{array}{r} 15 \\ 9 \overline{)13.5} \\ \underline{-9} \\ 45 \\ \underline{-45} \\ 0 \end{array}$	$\begin{array}{r} 1.5 \\ 9 \overline{)13.5} \\ \underline{-9} \\ 45 \\ \underline{-45} \\ 0 \end{array}$

Step One: Divide as you would with whole numbers.

Step Two: Write the decimal point in the quotient above the decimal point in the dividend.

When dividing decimals. You may need to add a zero in the quotient.

Example: Divide $6 \overline{)0.084}$

$$\begin{array}{r} 0.014 \\ 6 \overline{)0.084} \\ \underline{-6} \\ 24 \\ \underline{-24} \\ 0 \end{array}$$

Add zeros in the quotient to show 0 ones and 0 tenths

When dividing decimals, you may need to add a zero in the dividend. Remember, when you add a zero after the last digit of a decimal, the value stays the same.

Example: Divide: $18 \overline{)2.43}$

$$\begin{array}{r} \text{Step One} \\ 135 \\ 18 \overline{)2.430} \\ \underline{-18} \\ 63 \\ \underline{-54} \\ 90 \\ \underline{-90} \\ 0 \end{array}$$

$$\begin{array}{r} \text{Step Two} \\ 0.135 \\ 18 \overline{)2.430} \\ \underline{-18} \\ 63 \\ \underline{-54} \\ 90 \\ \underline{-90} \\ 0 \end{array}$$

Step One: Divide as you would with whole numbers. Add zero to the dividend to complete the division.

Step Two: Write the decimal point in the quotient above the decimal point in dividend.

Example: Marcella is knitting a baby blanket. She needs 189.8 grams of yarn. Each package of yarn is 52 grams. How many packages of yarn does she need?

To find out, divide.

$$\begin{array}{r} 3.65 \\ 52 \overline{)189.80} \\ \underline{-156} \\ 338 \\ \underline{-312} \\ 260 \\ \underline{-260} \\ 0 \end{array}$$

Marcella needs to buy four packages of yarn. The quotient, 3.65, must be rounded up to the nearest whole number so that Marcella will have enough yarn to finish the blanket.

Exercise 11 – A

Divide

1. $3 \overline{)34.5}$ 2. $6 \overline{)10.5}$ 3. $7 \overline{)9.8}$ 4. $5 \overline{)107.5}$

5. $8 \overline{)83.2}$ 6. $4 \overline{)29.68}$ 7. $9 \overline{)594.9}$ 8. $6 \overline{)0.108}$

9. $3 \overline{)9.321}$ 10. $8 \overline{)0.56}$ 11. $32 \overline{)2.4256}$ 12. $39 \overline{)10.062}$

13. $15 \overline{)15.6}$ 14. $27 \overline{)64.8}$ 15. $41 \overline{)224.27}$ 16. $69 \overline{)1.4076}$

17. $52 \overline{)2.8444}$ 18. $62 \overline{)1.736}$ 19. $21 \overline{)770.7}$ 20. $17 \overline{)5.2479}$

PART 12

Multiplying or Dividing by Power of 10

You can multiply by a power of ten mentally.

Multiply by Ten.

$$10 \times 2.34 = 23.4$$

$$10 \times 24.3 = 243$$

$$10 \times 243 = 2,430$$

Multiply by Hundred

$$100 \times 6.214 = 621.4$$

$$100 \times 62.14 = 6,214$$

$$100 \times 621.4 = 62,140$$

Multiply by 1,000

$$1000 \times 3.8724 = 3,872.4$$

$$1000 \times 38.724 = 38,724$$

$$1000 \times 387.24 = 387,240$$

Multiplying by 10 moves the decimal point one place to the right.

Multiplying by 100 moves the decimal point two places to the right.

Multiplying by 1,000 moves the decimal point three places to the right.

Multiplying by power of ten makes a greater number.

You can divide by a power of ten mentally.

Divide by 10

$$32.5 \div 10 = 3.25$$

$$3.25 \div 10 = 0.325$$

$$0.325 \div 10 = 0.0325$$

Divide by 100

$$284.3 \div 100 = 2.843$$

$$28.43 \div 100 = 0.2843$$

$$2.843 \div 100 = 0.02843$$

Divide by 1,000

$$4.7835 \div 1,000 = 4.7835$$

$$478.35 \div 1,000 = 0.47835$$

$$47.835 \div 1,000 = 0.047835$$

Dividing by 10 moves the decimal point one place to the left.

Dividing by 100 moves the decimal point two places to the left.

Dividing by 1,000 moves the decimal point three places to the left.

Dividing by a power of 10 makes a lesser number.

Exercise 12 – A

Multiply Mentally

1. 10×3.97 _____ 2. 10×0.09 _____ 3. 10×3.7 _____

4. 100×8.87 _____ 5. 100×4.63 _____ 6. 100×0.853 _____

7. $1,000 \times 2.43$ _____ 8. $1,000 \times 38.16$ _____ 9. $1,000 \times 0.09$ _____

Exercise 12 – B

Divide Mentally

10. $8.7 \div 10$ _____ 11. $12.83 \div 10$ _____ 12. $0.04 \div 10$ _____

13. $5.9 \div 100$ _____ 14. $0.82 \div 100$ _____ 15. $0.893 \div 100$ _____

16. $7.143 \div 1,000$ _____ 17. $4.16 \div 1,000$ _____ 18. $39.12 \div 1,000$ _____

Exercise 12 – C

Multiply or divide mentally.

19. 100×3.47 _____ 20. 10×0.763 _____

21. $843.6 \div 1,000$ _____ 22. $0.16 \div 10$ _____

23. $1,000 \times 85.1$ _____ 24. $9.198 \div 100$ _____

25. $0.659 \div 10$ _____ 26. $12.07 \div 10$ _____

PART 13

Problem solving strategy:

Organizing Information in a Trade:

Barbara wants to go to the beauty salon to get a haircut, a permanent, and a manicure. She reads these ads in the newspaper to decide which salon has the least expensive rates.

Shirley's Shears		Chuck's Cutting Crib		Carole's Comb Out	
Haircuts	\$20.25	Haircut	\$10.00	Haircut	\$35.85
Manicure	\$15.99	Manicure	\$29.95	Manicure	\$21.89
Tints	\$38.76	Tints	\$18.70	Tints	\$70.89
Permanent	\$59.88	Permanent	\$50.00	Permanent	\$61.45

She decides to make a table to organize the information.

Prices at Each Salon

Salon	Haircut	Permanent	Manicure	Total
Shirley's	\$20.25	\$59.88	\$15.99	\$96.12
Chuck's	\$10.00	\$50.00	\$29.95	\$89.95
Carole's	\$35.85	\$61.45	\$21.89	\$119.19

Barbara's table is organized in such a way that it is easy to add the prices. She has columns that are labeled and rows that give the prices for each service. Barbara can see from the Total Column that it would cost less to have a haircut, permanent, and manicure at Chuck's Cutting Crib

Exercise 13 – A

Carole’s Comb out Salon sells shampoo, conditioner, gel, and mousse. Use Carole’s receipts to complete the table.

Sales at **Carole’s Comb Out**

Day	Shampoo	Conditioner	Gel	Mousse	Total
Monday	3	0	6	0	9
Tuesday					
Wednesday					
Thursday					
Friday					

<i>Monday</i> <i>Shampoo</i> <i>3 Bottles</i> <i>6 gel</i>	<i>Tuesday</i> <i>18 Conditioner</i> <i>3 Mousse</i>	<i>Wednesday</i> <i>13 Shampoo</i> <i>19 Mousse</i>	<i>Thursday</i> <i>12 Conditioner</i> <i>16 Gel</i>	<i>Friday</i> <i>14 Shampoo</i> <i>10 Conditioner</i>
---------------------------------------------------------------------	------------------------------------------------------------	-----------------------------------------------------------	-----------------------------------------------------------	-------------------------------------------------------------

Use the table to answer the questions.

5. On which day were the most products sold?

6. Was more shampoo or conditioner sold this week?

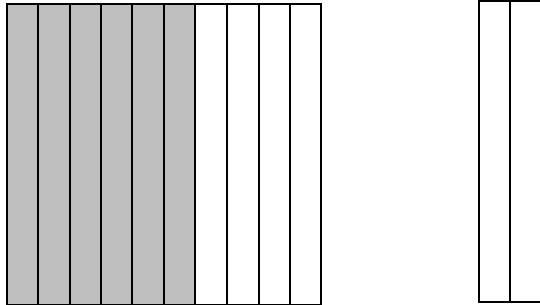
7. How many jars of gel were sold altogether this week?

8. On which day of the week were the most bottles of shampoo sold?

9. How many products did Carole sell altogether this week?

Dividing by Tenths

Look at the place value models. Each strip represents 1 tenth, or 0.1.



How many times can you match the two tenths strip with the shaded part of the tenths model?

This model shows $0.6 \div 0.2 = 0.3$. To make dividing easier; you can also make the divisor a whole number by multiplying the divisor and the dividend by the same power of 10.

Example: Divide 6.8 by 0.4

Step 1: $(10 \times 0.4) \quad 0.4 \overline{)6.8} \quad (10 \times 6.8)$

Step 2: $0.4 \overline{)6.8}$
 $\rightarrow \quad \rightarrow$

Step 3: 17
 $4 \overline{)68}$

Step 1: Multiply the divisor and the dividend by a power of 10.

Step 2: Move the decimal points one place to the right.

Step 3: Divide.

Check by multiplying.

$$17 \times 0.4 = 6.8$$

Divide 4.23 by 0.9

Step 1: Multiply the divisor and the dividend by 10.

$$(10 \times 0.9) \quad 0.9 \overline{)4.23} \quad (10 \times 4.23)$$

Step 2: Move the decimal points to the right.

$$\begin{array}{r} 0.9 \overline{)42.3} \\ \underline{0.9} \\ 33 \\ \underline{33} \\ 00 \\ \underline{00} \\ 00 \\ \underline{00} \\ 00 \end{array}$$

Step 3: Divide.

$$\begin{array}{r} 4.7 \\ 9 \overline{)42.3} \\ \underline{-36} \\ 63 \\ \underline{-63} \\ 0 \end{array}$$

Exercise 14 – A

Divide

1. $0.6 \overline{)7.2}$ 2. $0.4 \overline{)2.2}$ 3. $0.7 \overline{)4.41}$ 4. $0.3 \overline{)0.267}$

5. $0.8 \overline{)50.08}$ 6. $0.5 \overline{)0.32}$ 7. $0.2 \overline{)6.22}$ 8. $0.9 \overline{)11.07}$

9. $1.3 \overline{)85.02}$ 10. $6.2 \overline{)2.232}$ 11. $4.9 \overline{)15.729}$ 12. $7.2 \overline{)30.6}$

Exercise 14 – B**Divide**

13 $3.2 \overline{)5.28}$ 14 $4.9 \overline{)22.393}$ 15 $6.2 \overline{)2.9636}$ 16 $8.9 \overline{)2.136}$

17 $4.1 \overline{)1.5129}$ 18 $2.2 \overline{)2.1186}$ 19 $5.8 \overline{)182.12}$ 20 $3.7 \overline{)3.145}$

21 $31.2 \overline{)196.56}$ 22 $49.7 \overline{)62.125}$ 23 $50.6 \overline{)23.782}$ 24 $13.8 \overline{)3.726}$

Exercise 14 – C**Solve.**

25. James drove 111.54 miles on a business trip. He averaged 50.7 miles per hour. How many hours did James Drive?

Calculating

You can use the constant feature on a calculator to find the quotient to division exercises without using the \div key.

Example: $36.6 \div 6.1$ Press $36.6 - 6.1 = 0$

The number of times you pressed = to get 0 is the quotient, 6.

Find the quotient without using the \div key.

26. $2.1 \div 0.7$ _____ 27. $1.6 \div 0.2$ _____ 28. $16.4 \div 4.1$ _____

PART 15

Dividing by hundredths and thousandths.

A chemist has 29.04 grams of substance needed to perform an experiment. She must put 0.24 grams into each test tube. How many test tubes does she need?

To find out, divide 29.04 by 0.24. Remember, when the divisor is a decimal, multiply it by a power of 10 to make a whole number.

Step one: Multiply the divisor and the dividend by 100.

$$(100 \times 0.24) \quad 0.24 \overline{) 29.04} \quad (100 \times 29.04)$$

Step Two: Move the decimal points two place to the right.

$$0.24 \overline{) 29.04}$$

→ →

Step Three: Divide.

$$\begin{array}{r} 121 \\ 24 \overline{) 2904} \end{array}$$

The chemist will need 121 test tubes.

Example: Divide 2.25 by 0.9

$$(100 \times 0.09) \ 0.09 \overline{) 2.25} \quad (100 \times 2.25)$$

$$0.09 \overline{) 2.25}$$

$$\begin{array}{r} 25 \\ 9 \overline{) 225} \end{array}$$

To divide a decimal by thousandths, multiply the divisor and dividend by 1,000. Sometimes you may need to add a zero in the dividend to complete the division.

Example: Divide 797.44 by 0.623

$$\text{Step One: } (1,000 \times 0.623) \quad 0.623 \overline{) 797.44} \quad (1,000 \times 797.44)$$

$$\text{Step Two: } 0.623 \overline{) 797.440} \quad (\text{add a zero})$$

$$\begin{array}{r} \text{Step Three:} \\ 1280 \\ 623 \overline{) 797440} \\ \underline{- 623} \\ 1744 \\ \underline{- 1246} \\ 4984 \\ \underline{- 4984} \\ 0 \end{array}$$

Example: Divide 8.2755 by 3.065

$$\text{Step One: } (1,000 \times 3.065) \quad 3.065 \overline{) 8.2755} \quad (1,000 \times 8.2755)$$

$$\text{Step Two: } 3.065 \overline{) 8.2755}$$

$$\begin{array}{r} \text{Step Three:} \\ 2.7 \\ 3.065 \overline{) 8275.5} \\ \underline{- 6130} \\ 2145.5 \\ \underline{- 2145.5} \\ 0 \end{array}$$

Exercise 15 – A**Divide**

1. $0.08 \overline{)2.104}$ 2. $0.04 \overline{)15.6}$ 3. $0.06 \overline{)1.35}$ 4. $0.09 \overline{)5.742}$

5. $0.11 \overline{)4.983}$ 6. $0.05 \overline{)11.5}$ 7. $0.03 \overline{)1.569}$ 8. $0.02 \overline{)1.928}$

9. $0.17 \overline{)9.40525}$ 10. $0.014 \overline{)11.9588}$ 11. $8.26 \overline{)51.4598}$

12. $0.247 \overline{)15.5363}$ 13. $0.743 \overline{)2.57821}$ 14. $0.812 \overline{)1.37228}$

Exercise 15 – B

Avocados sell for \$ 1.09 each. Tell how many were purchased for each sale.

15. \$6.54 _____

16. \$3.27 _____

17. \$16.35 _____

Application

Area

Suppose you want to carpet the family room. You can find the area of the room by multiplying the length times the width.

The length is 20 feet.

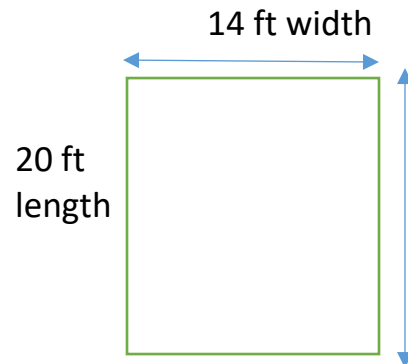
The width is 14 feet.

Multiply 20×14 to find the area.

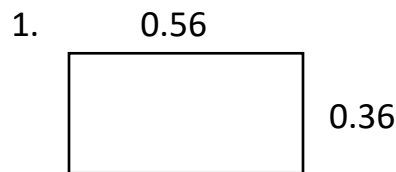
Area = 20×14

Area = 280

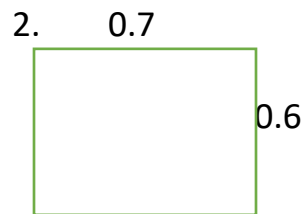
The area of the family room is 280 square feet.



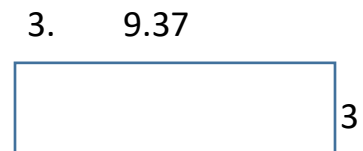
What is the area? Complete.



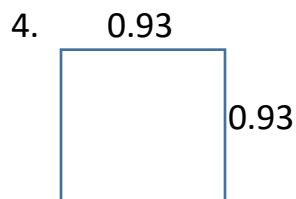
_____ Square units



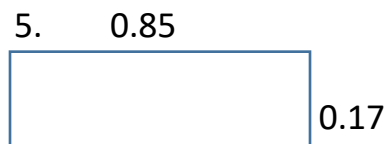
_____ square units



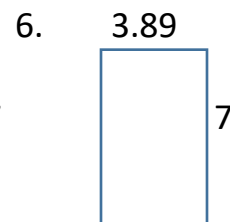
_____ square units



_____ Square Unit



_____ Square Unit



_____ Square Unit

**Module 6: Decimals in Real-Life
Review 2**

Multiply.

1.
$$\begin{array}{r} 0.24 \\ \times 6 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 0.92 \\ \times 8 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 4.6 \\ \times 3 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 24.7 \\ \times 18 \\ \hline \end{array}$$

5.
$$\begin{array}{r} \$19.25 \\ \times 324 \\ \hline \end{array}$$

6.
$$\begin{array}{r} 0.809 \\ \times 0.7 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 0.82 \\ \times 0.5 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 0.319 \\ \times 3.7 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 18.43 \\ \times 16.1 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 13.7 \\ \times 8.4 \\ \hline \end{array}$$

11.
$$\begin{array}{r} 6.3 \\ \times 124.73 \\ \hline \end{array}$$

12.
$$\begin{array}{r} 0.8 \\ \times 113.9 \\ \hline \end{array}$$

Divide.

13. $5 \overline{)22.6}$

14. $9 \overline{)4.05}$

15. $14 \overline{)3466.4}$

16. $58 \overline{)31.726}$

17. $10 \overline{)4.683}$

18. $0.7 \overline{)43.75}$

19. $0.8 \overline{)17.2}$

20. $0.3 \overline{)16.92}$

21. $0.14 \overline{)8.876}$

22. $0.73 \overline{)32.2733}$

23. $0.256 \overline{)0.8192}$