4.6 Applications

We studied geometry in earlier sections of this book. Now, we will revisit some geometry applications to use decimal numbers.

Recall that the area of a triangle can be written as \( A = \frac{1}{2}bh \) where \( b \) is the length of the base and \( h \) is the height. In this chapter, since our data values are decimal numbers, instead of using the fraction \( \frac{1}{2} \), we will use its decimal equivalent 0.5.

**Example 1:** Calculate the area of the given triangle.

\[ \text{Area} = 0.5 \times b \times h \]

Notice the base \( b = 4.7 \text{ cm} \) and the height \( h = 0.7 \text{ cm} \). So calculate:

\[
\begin{align*}
\text{Area} &= 0.5 \times 4.7 \times 0.7 \\
&= 0.5 \times 3.29 \\
&= 1.645 \text{ square centimeters (Don't forget squared units for area.)}
\end{align*}
\]

**Answer:** Area = 1.645 cm\(^2\)

**Practice 1:** Calculate the area of the given triangle. **Answer:** \( A = 4.25 \text{ in}^2 \)

[Watch It: http://youtu.be/trHt2p7s1Xo](http://youtu.be/trHt2p7s1Xo)
Now recall the formulas for circumference and area of a circle:

<table>
<thead>
<tr>
<th>CIRCUMFERENCE AND AREA OF A CIRCLE:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Circumference</strong> is $C = 2\pi r$</td>
</tr>
<tr>
<td>$\pi \approx \frac{22}{7} \approx 3.14$</td>
</tr>
<tr>
<td><strong>Area of a Circle</strong> is $A = \pi r^2$</td>
</tr>
<tr>
<td>$\pi \approx \frac{22}{7} \approx 3.14$</td>
</tr>
</tbody>
</table>

When we studied fractions, we used the fraction approximation of $\pi : \pi \approx \frac{22}{7}$. In this chapter, since our data values are decimal numbers, we will use the decimal approximation for $\pi$ instead: $\pi \approx 3.14$.

**Example 2:** Determine the *circumference* and *area* of the given circle, using $\pi \approx 3.14$.

![Circle with radius 2.3 mm]

Notice the radius $r$ of the circle is 2.3 mm.

**Circumference:**

$$C = 2\pi r$$

$$C \approx 2 \times 3.14 \times 2.3 = 14.444 \text{ mm}$$

**Area:**

$$A = \pi r^2$$

$$A \approx 3.14 \times 2.3^2 = 3.14 \times 5.29 = 16.6106 \text{ mm}^2$$

**Practice 2:** Determine the *circumference* and *area* of the circle.  

**Answer:**

*Circumference:*

$$C = 4.396 \text{ ft}$$

*Area:*

$$A = 1.5386 \text{ ft}^2$$

**Watch It:** [http://youtu.be/9TYL-QcHGDM](http://youtu.be/9TYL-QcHGDM)
In previous sections, we learned how to perform operations on decimal numbers. Now let’s explore some additional applications of when to use those operations.

Example 3: If Jean has 1.08 pounds of butter and 0.93 pounds of margarine, find the sum of the weights.

The sum is the answer to an addition problem. Line up the decimal points and add:

\[
\begin{array}{c}
1.08 \\
+0.93 \\
2.01
\end{array}
\]

Answer: 2.01 pounds

Practice 3: At his restaurant job, Drew earned $43.90 in tips on Friday and $57.75 in tips on Saturday. How much did he earn in tips altogether? Answer: $101.65

Watch It: [http://youtu.be/_u61gRKOawA](http://youtu.be/_u61gRKOawA)

Example 4: Abby purchased a book costing $7.99 with a $20 bill. How much change will she receive?

Subtract the cost of the book from the amount paid. Line up the decimal points to subtract:

\[
\begin{array}{c}
\$21.00 \\
- \$7.99 \\
\$12.01
\end{array}
\]

Answer: $12.01

Practice 4: Alex purchased a notebook costing $3.91 with a $5 bill. How much change will he receive? Answer: $1.09

Example 5: If Joe bought a bicycle for $258.99 and Ted bought a bicycle for $182.95, what is the difference in the price of the two bicycles?

The difference is the answer to a subtraction problem. Subtract the cost of Ted’s bicycle from the cost of Joe’s bicycle. Line up the decimal points and subtract:

\[
\begin{array}{c}
15.99 \\
-18.95 \\
\hline
7.04
\end{array}
\]

Answer: $76.04

Practice 5: Lisa bought a spool of ribbon containing 5 yards. She used 3.25 yards of the ribbon to make a bow. How many yards of ribbon are left on the spool?

Answer: 1.75 yards

Watch It: [Video Link]

Example 6: A computer CD costs $1.88. How many CDs can be purchased with $18.80?

Divide the total amount by the cost of one item. So divide: $18.80 ÷ $1.88. Set up the long division with the dividend as $18.80 and the divisor as 1.88.

\[
\begin{array}{c}
188.0 \\
\hline
10. \\
\hline
-188. \\
\hline
0
\end{array}
\]

Answer: 10 CDs can be purchased.

Note: In general, to determine how many items of the same price can be purchased with a particular amount of money, divide the amount of money by the cost per item.

Practice 6: A pack of soda containing 24 cans costs $6.99. How much does each can of soda cost? Round the answer to the hundredths place.

Answer: $0.29

Watch It: [Video Link]
**Example 7:** You need to buy 8 packages of computer paper. Each package of paper costs $4.50. How much money do you need?

Multiply the number of packages (8) by the cost of each package ($4.50):

\[
\begin{array}{c}
4.50 \\
\times 8 \\
\hline
36.00 \\
\end{array}
\]

**Answer:** You need $36.00.

Note: In general, to determine how much money is needed to buy many items where each item costs the same amount, **multiply** the number of items by the cost per item.

<table>
<thead>
<tr>
<th>Practice 7</th>
<th>Bananas cost $0.59 per pound. How much will 4 pounds of bananas cost?</th>
<th><strong>Answer:</strong> $2.36</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watch It:</td>
<td><a href="http://youtu.be/WWB7-qM2hE8">http://youtu.be/WWB7-qM2hE8</a></td>
<td></td>
</tr>
</tbody>
</table>

Many of the examples above involved money because money is a practical application of decimal numbers. We will continue to address some of the mathematical skills needed to live a financially healthy life. Let’s consider bank accounts. There are generally two types of accounts: **savings** accounts and **checking** accounts.

**Savings** accounts are one way of putting money aside and earning interest on it. By saving small amounts of money, you can build wealth slowly but steadily over time. Money placed in these accounts is not intended for everyday expenses, like purchasing movie tickets or buying a new music CD. Instead, the purpose of a savings account is to provide the individual with a safe place to save money that can be used at a later date to make a major purchase such as a car, or to fund a large expense such as a college education or a house.

Have you ever tried to save up for something that you really wanted, only to be unsuccessful because you were constantly taking small amounts of cash out of the money you were “saving”? While most of us have good intentions about saving money and understand that it takes some time and effort to save up for a major purchase, many of us don’t have the willpower to keep our hands off the cash when we have access to it. A savings account can help with this.

Some people find it helpful to think of a savings account like a pail of water. The amount of water in the pail represents the money that you have placed in the savings account. When you place the pail under the tap and turn on the tap, the amount of water in the pail increases. The water from the tap is a **deposit**. Let’s assume that your pail is also fitted with a tap at the bottom.
Each time you open the bottom tap, the amount of water in the pail decreases. When you make a withdrawal from your savings account, you decrease its value. Just like keeping your pail full, the key to successful saving is making sure that you have more money going into the account than you do coming out of it. In order for the amount of water in the pail to increase, water must flow into the pail faster than it flows out of the tap at the bottom of the pail. Similarly, to make your savings grow, the amount that you deposit into the account should be greater than the amount that you withdraw from the account. You also need to remember that with a savings account, there is a little extra inflow into the account coming from the interest earnings that are paid to you by the bank each month.

Checking accounts, on the other hand, are designed to make it easy for people to pay their bills or purchase things without having to go to the bank and withdraw cash. Traditional checking accounts grant check-writing privileges. The privileges allow the account holder to make payments with checks for items such as utilities, rent, mortgage payments, food, and a variety of other expenses. The bank will provide you with a check register to keep with your checks. In the check register, you can record the date and amount of deposits as well as the date, check number, payee (the person to whom the check is written) and amount of each check as it is written.

It is important to keep your check register up-to-date after each transaction. While Electronic Funds Transfers (EFTs) are immediately debited from your account, paper checks take much longer to process—sometimes days or weeks, depending on when the recipient of the check decides to submit the check for payment.

The account holder could be charged a fee because there are not enough funds in the account to cover a check/debit. The fee is called a NSF (non-sufficient fund) fee.

At the end of each month, the bank will send you a statement which includes a statement balance. In addition to the balance, the statement will list all of the debits and credits for the account made before the statement date. It is important to remember that the statement balance may be different from the actual balance in the account because additional transactions have been made and not all debits cleared since the statement was printed and mailed to you. At the end of each month, you should balance or reconcile your checkbook by finding your account balance. Use your checkbook register and compare it to the statement to verify its accuracy and to ensure that your account has sufficient funds to cover outstanding debits.

The example below shows how a typical check register looks and how to balance the checkbook.
Example 9: Below is a list of transactions made to your checking account for the month of September 2013. Record each transaction in the check register below. As you record each one, calculate the current, updated balance in the account.

a. On September 1, your account balance was $115.12.
b. On September 1, you used Check #100 at the supermarket to buy groceries costing $64.14.
c. On September 2, you used Check #101 at the gas station to pay for $40 worth of gas.
d. On September 6, your paycheck in the amount of $810 was deposited directly into your checking account via an EFT.
e. On September 6, you used Check #102 to pay a bill for $650.00 for your rent.

Consider how each of those transactions is entered into the check register below. After recording each entry, calculate the current balance in the account.

a. Enter the beginning balance of $115.12 in the first line of the register.
b. Enter Check 100 on 9/1/2013 to the Supermarket for a check amount of $64.14. Now calculate the current balance. Since this amount is a withdrawal from the account, subtract:
   \[ \text{Balance} = \text{Beginning Balance} - \text{Check/Debit Amount} = 115.12 - 64.14 = 50.98 \] [Enter this amount into the “Balance” column.]
c. Enter Check 101 on 9/2/2013 to the Gas Station for a check amount of $40.00. To calculate the current balance after this withdrawal, subtract:
   \[ \text{Balance} = \text{Previous Balance} - \text{Check/Debit Amount} = 50.98 - 40.00 = 10.98 \] [Enter this amount into the “Balance” column.]
d. Enter for 9/6/2013 a Payroll Deposit of $810.00. This amount is a deposit so add its amount to the previous balance:
   \[ \text{Balance} = \text{Previous Balance} + \text{Deposit/Credit Amount} = 10.98 + 810.00 = 820.98 \] [Enter this amount into the “Balance” column.]
e. Enter Check 102 on 9/6/2013 for Rent for a check amount of $650.00. To calculate the current balance after this withdrawal, subtract:
   \[ \text{Balance} = \text{Previous Balance} - \text{Check/Debit Amount} = 820.98 - 650.00 = 170.98 \] [Enter this amount into the “Balance” column.]

<table>
<thead>
<tr>
<th>Check Number</th>
<th>Date</th>
<th>Transaction Description</th>
<th>Check/Debit Amount</th>
<th>Deposit/Credit Amount</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>9/1/2013</td>
<td>Supermarket</td>
<td>$64.14</td>
<td></td>
<td>$50.98</td>
</tr>
<tr>
<td>101</td>
<td>9/2/2013</td>
<td>Gas Station</td>
<td>$40.00</td>
<td></td>
<td>$10.98</td>
</tr>
<tr>
<td>9/6/2013</td>
<td>Payroll Deposit</td>
<td>$810.00</td>
<td></td>
<td></td>
<td>$820.98</td>
</tr>
<tr>
<td>102</td>
<td>9/6/2013</td>
<td>Rent</td>
<td>$650.00</td>
<td></td>
<td>$170.98</td>
</tr>
</tbody>
</table>

Notice also if you were only interested in the account balance at the end of the month, you could use the following formula:

**Account balance:** Account balance equals the starting balance plus the total amount deposits made during the month minus the total amount of checks written during the month.
Account balance = Starting Account Balance + Total Deposits – Total of Amount of Checks

As shown in the check register:

- Start of the month account balance = $115.12
- Total amount of deposits made = $810.00
- Total amount of withdrawals made = $754.14 ( = $64.14 + $40.00 + $650.00)

So the account balance at the end of the month is:

\[ 115.12 + 810.00 - 754.14 = 170.98 \]

The picture below shows how Check #100 would be written:

The picture below shows how Check #100 would be written:
Practice 8: Below is a list of transactions that occurred on your checking account for the month of May. Record each transaction in the check register on the next page and determine the account balance at the end of the month.

1. On May 1, the account balance was $365.12.
2. On May 10, your paycheck for $615.90 was deposited into your account by direct deposit.
3. On May 15, you wrote check number 201 for $51.71 to The Party Store to buy decorations for your birthday party.
4. On May 20, you deposited a birthday gift from your uncle of $50 cash.
5. On May 29, you used your debit card at Cool Cakes to pay $31.80 for your birthday cake for the party.

Answer: Account Balance: $947.51

<table>
<thead>
<tr>
<th>Check Number</th>
<th>Date</th>
<th>Transaction Description</th>
<th>Check/Debit Amount</th>
<th>Deposit/Credit Amount</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/01</td>
<td>5/01</td>
<td>Beginning Balance</td>
<td></td>
<td></td>
<td>365.12</td>
</tr>
<tr>
<td>5/10</td>
<td>5/10</td>
<td>Paycheck</td>
<td></td>
<td>615.90</td>
<td>981.02</td>
</tr>
<tr>
<td>201</td>
<td>5/15</td>
<td>The Party Store</td>
<td>51.71</td>
<td></td>
<td>929.31</td>
</tr>
<tr>
<td>5/20</td>
<td>5/20</td>
<td>Cash from Uncle</td>
<td></td>
<td>50.00</td>
<td>979.31</td>
</tr>
<tr>
<td>5/29</td>
<td>5/29</td>
<td>Cool Cakes</td>
<td>31.80</td>
<td></td>
<td>947.51</td>
</tr>
</tbody>
</table>

Watch It: [http://www.youtube.com/watch?v=6IIfi3SgdCe](http://www.youtube.com/watch?v=6IIfi3SgdCe)

Watch All: [http://youtu.be/yNZFKq94XFI](http://youtu.be/yNZFKq94XFI)
### 4.6 Applications Exercises

1. Calculate the area of the given triangle.

   ![Triangle with sides 8.5 in, 7.6 in, 14.7 in, and base 13.2 in.]

2. Calculate the area of the given triangle.

   ![Triangle with sides 4.2 cm, 3.7 cm, 5.1 cm, and base 3.1 cm.]

3. Calculate the area of the given triangle.

   ![Triangle with sides 4.1 ft, 2.3 ft, 9.8 ft, and base 6.8 ft.]

4. Calculate the area of the given triangle.

   ![Triangle with sides 15.3 km, 12 km, 13.8 km, and base 12.8 km.]

331
5. Calculate the **circumference** and the **area** of the given circle, using $\pi \approx 3.14$.

   - 18.2 m

6. Calculate the **circumference** and the **area** of the given circle, using $\pi \approx 3.14$.

   - 5.33 ft

7. Calculate the **circumference** and the **area** of the given circle, using $\pi \approx 3.14$.

   - 1.6 in

8. Calculate the **circumference** and the **area** of the given circle, using $\pi \approx 3.14$.

   - 12.5 cm
9. Last week, Kim put 17.85 gallons of gas in her van. This week, she put in 21.9 gallons of gas. What is the total number of gallons that she put in her van?

10. Karen bought 3.125 pounds of bananas and 2.5 pounds of strawberries. How many pounds of fruit did she buy?

11. The thickness of two sheets of paper is 0.023 inches and 0.019 inches, respectively. What is the difference in their thickness?

12. The winner, Denver Dasher, in a horse race ran the mile in 1.47 minutes. The last place horse, Ivan Trotsky, completed the mile in 2 minutes. How many minutes faster was the winner?

13. Mary bought a dress on sale for $31.99. The regular price of the dress was $49.97. How much did Mary save by purchasing the dress when it was on sale?

14. If there were 2.89 liters of cleaning solution and 1.26 liters spilled, how much is left?

15. The long-term substitute in a school was paid $48.17 per day. The daily substitute was paid $27.98 per day. How much more was the long-term substitute paid per day?

16. The long-term substitute was paid $48.17 per day and he worked 5 days this week. How much did he earn?

17. If a radio costs $99.90, how much will 3 radios cost?

18. If socks cost $3.50 pair, how many pairs can be purchased with $42?

19. An eraser costs $0.05 at the school store. How many erasers can be bought for $3?

20. Martin’s coffee and muffin cost $7.34. He paid the cashier with a $10 bill. How much change did he receive?

21. Sally purchased a book and paid with a $20 bill. She received $3.06 in change. What was the cost of the book?

22. On March 1, the balance in Sarah’s bank account was $291.65. If she deposited one check for $99.21 and another for $7.35, how much money is now in her account?

23. On August 1, the balance in Anthony’s bank account was $89.52. He deposited a check for $25 and he wrote a check for $31.25. How much money is now in his account?
24. You are planning to travel over spring break to Atlanta, Georgia. You have tried to keep careful track of your money over the past month using a list of transactions.

- On March 1, your account balance was $248.16.
- On March 2, you used check number 101 to pay $200 to reserve a hotel. The check was made payable to Atlanta Hotels & Entertainment.
- Your paycheck from your job was direct deposited via an EFT on March 4. The amount was $796.63.
- On March 7, you made two debit card purchases. One was to Student Gear for $125.73 for a new suitcase. The other was to My Favorite School for the purchase of a new college sweatshirt for the trip. It cost you $28.45.

Record each transaction in your check register. If the transaction is in the form of a check, be sure to write the check correctly on the sample check provided. When you have finished recording all the transactions, determine your current account balance.

<table>
<thead>
<tr>
<th>Check Register</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check Number</td>
</tr>
<tr>
<td>---------------</td>
</tr>
<tr>
<td>101</td>
</tr>
</tbody>
</table>

![Sample Check](http://images.brighthub.com)
4.6 Applications Exercises Answers

1. 55.86 in²
2. 7.905 cm²
3. 11.27 ft²
4. 82.8 km²
5. Circumference: 114.296 m  Area: 1040.0936 m²
6. Circumference: 33.4724 ft  Area: 89203946 ft²
7. Circumference: 10.048 in  Area: 8.0384 in²
8. Circumference: 78.5 cm  Area: 490.625 cm²
9. 39.75 gal
10. 5.625 lbs.
11. 0.004 in
12. 0.53 min
13. $17.98
14. 1.63 L
15. $20.19
16. $240.85
17. $299.70
18. 12 pairs
19. 60 erasers
20. $2.66
21. $16.94
22. $398.21
23. $83.27

24. [Check register image]

<table>
<thead>
<tr>
<th>Check Number</th>
<th>Date</th>
<th>Transaction Description</th>
<th>Check/Debit Amount</th>
<th>Deposit/Credit Amount</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/1</td>
<td>3/1</td>
<td>Beginning Balance</td>
<td></td>
<td></td>
<td>248.16</td>
</tr>
<tr>
<td>101</td>
<td>3/2</td>
<td>Atlanta Hotels &amp; Entertainment</td>
<td>200.00</td>
<td></td>
<td>48.16</td>
</tr>
<tr>
<td></td>
<td>3/4</td>
<td>Paycheck</td>
<td></td>
<td>796.63</td>
<td>844.79</td>
</tr>
<tr>
<td></td>
<td>3/7</td>
<td>Student Gear – suitcase</td>
<td>125.73</td>
<td></td>
<td>719.06</td>
</tr>
<tr>
<td></td>
<td>3/7</td>
<td>My Favorite School</td>
<td>28.45</td>
<td></td>
<td>690.61</td>
</tr>
</tbody>
</table>
### CHAPTER 4 SUMMARY
Decimals

#### Section 4.1

<table>
<thead>
<tr>
<th>Place Value</th>
<th>321.4758</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>hundreds</strong></td>
<td><strong>thousandths</strong></td>
</tr>
<tr>
<td><strong>tens</strong></td>
<td><strong>ten-thousandths</strong></td>
</tr>
<tr>
<td><strong>ones</strong></td>
<td><strong>hundredths</strong></td>
</tr>
<tr>
<td><strong>tenths</strong></td>
<td><strong>thousandths</strong></td>
</tr>
</tbody>
</table>

**Comparing Numbers**
Starting from the left, compare the digits “place-by-place” until the digits differ.

1.6382 > 1.6359

**Estimating Numbers**
Working from the left, circle the first non-zero digit.

- Look at next digit: less than 5, leave circled digit as is
- 5 or more, add one to circled digit
- If needed, replace the following digits with 0’s to hold the place value of the circled digit

2.971 → 3.000

**Rounding Numbers**
Circle the place you are rounding to.

- Look at digit to the right: less than 5, leave circled digit as is
- 5 or more, add one to circled digit
- If needed, replace the following digits with 0’s to hold the place values of the remaining digits.

Round to the nearest hundredth

4.6528 → 4.65

#### Section 4.2

<table>
<thead>
<tr>
<th>Converting Decimals to Fractions</th>
<th>Convert 3.025 to a Fraction</th>
<th>Converting Fractions to Decimals</th>
<th>Convert $\frac{3}{20}$ to a Decimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keep whole # part.</td>
<td>3.025 = $\frac{3025}{1000}$</td>
<td>Get multiple of 10 in denominator:</td>
<td>$3 \times \frac{1}{20} = \frac{15}{100}$</td>
</tr>
<tr>
<td>Numerator:</td>
<td></td>
<td>multiply top &amp; bottom by same #</td>
<td>15</td>
</tr>
<tr>
<td>decimal part of #</td>
<td></td>
<td>Note how many 0’s in denominator.</td>
<td>100</td>
</tr>
<tr>
<td>Denominator:</td>
<td></td>
<td>Write the numerator.</td>
<td></td>
</tr>
<tr>
<td>corresponds to last place value in decimal</td>
<td></td>
<td>Place decimal point:</td>
<td></td>
</tr>
<tr>
<td>Reduce fraction.</td>
<td></td>
<td>Start at right, move left as many places as 0’s in denominator.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$3 \frac{1}{40}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Converting Fractions to Decimals**
Get multiple of 10 in denominator:

- multiply top & bottom by same #
- Note how many 0’s in denominator.
- Write the numerator.
- Place decimal point: Start at right, move left as many places as 0’s in denominator.

#### Section 4.3

<table>
<thead>
<tr>
<th>Adding and Subtracting Decimals</th>
<th>63.59 + 4.70</th>
<th>63.59 - 4.70</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write numbers with decimal points lined up.</td>
<td>63.59</td>
<td>63.59</td>
</tr>
<tr>
<td>Insert 0’s as placeholders.</td>
<td>+ 4.70</td>
<td>- 4.70</td>
</tr>
<tr>
<td>Add or subtract as normal.</td>
<td>68.29</td>
<td>58.89</td>
</tr>
<tr>
<td>Place decimal point in answer directly below others.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Section 4.4

**Multiplying Decimals**
- Right align the factors.
- Multiply as normal.
- Place decimal point in answer so that there are as many digits to the right of the decimal point as the original two factors combined.

\[
\begin{array}{c}
3.45 \\
\times 2.6 \\
\hline
8.970
\end{array}
\]  

(2 decimal places)

(1 decimal place)

(3 decimal place)

**Dividing Decimals**
- Move the decimal point:
  - In divisor, all the way to the right.
  - In dividend, the same number of places to the right.
- Divide as normal.
- Put the decimal point directly above the decimal point in the dividend.

\[
\begin{array}{c}
0.23 \overrightarrow{1.173} = 0.23 \overrightarrow{117.3}
\end{array}
\]  

\[
\begin{array}{c}
5.1
\end{array}
\]  

\[
\begin{array}{c}
023. \overrightarrow{117.3}
\end{array}
\]  

\[
\begin{array}{c}
-115
\end{array}
\]  

\[
\begin{array}{c}
23
\end{array}
\]  

\[
\begin{array}{c}
-23
\end{array}
\]  

\[
\begin{array}{c}
0
\end{array}
\]  

**Converting Fractions to Decimals**
- To write \( \frac{a}{b} \) as a decimal:
  - Write \( \frac{1}{8} \) as a decimal:
  - Perform the long division.

\[
\begin{array}{c}
0.125
\end{array}
\]  

\[
\begin{array}{c}
1.000
\end{array}
\]  

\[
\begin{array}{c}
-8
\end{array}
\]  

\[
\begin{array}{c}
-20
\end{array}
\]  

\[
\begin{array}{c}
-16
\end{array}
\]  

\[
\begin{array}{c}
40
\end{array}
\]  

### Section 4.5

**Metric Conversions**

<table>
<thead>
<tr>
<th>KILO</th>
<th>HECTO</th>
<th>DEKA</th>
<th>BASIC UNIT</th>
<th>DECI</th>
<th>CENTI</th>
<th>MILLI</th>
</tr>
</thead>
<tbody>
<tr>
<td>king</td>
<td>Henry’s</td>
<td>daughter</td>
<td>meter</td>
<td>liter</td>
<td>gram</td>
<td></td>
</tr>
</tbody>
</table>

- **Converting By Moving the Decimal Point:**
  - Count # of jumps from prefix given to prefix wanted.
  - Note direction of jumps.
  - Move decimal point the same direction and # of places.
  - Fill in spaces with 0’s as needed.

**Convert 4.56 liters (L) to milliliters (mL)**

\[
\begin{array}{c}
4.56 \text{ L} \rightarrow 4560 \text{ mL}
\end{array}
\]

**Financial Applications**

- **Account Balance** = Beginning Balance + Deposits – Withdrawals (checks written)

### Section 4.6

**Geometry Applications**
- **Area of a Triangle:** \( A = 0.5 \times b \times h \)
- **Area of a Circle:** \( A = \pi r^2 = 3.14 \times r^2 \)
- **Circumference of a Circle:** \( C = 2\pi r \)
\[
C = 2 \times 3.14 \times r
\]
1. In the number 8390.6152,
a) What digit is in the thousandths place?
b) What digit is in the hundreds place?

2. Compare the numbers that follow by filling in the blank with <, >, or =.
5.302 ___ 5.320

3. Write the numbers in order from least to greatest. 6.903, 6.91, 6.89, 6.90

4. Estimate
   a) 0.063
   b) 487

5. Round 7412.893
   a) to the nearest tenth
   b) to the nearest hundredth

6. Write the decimal as a fraction in simplest form.
   a) 0.7
   b) 1.64

7. Write the fraction as a decimal.
   a) \( \frac{19}{1000} \)
   b) \( \frac{23}{20} \)

8. Show how to set up the problem 685 + 1.7 to calculate by hand, but do not add.

9. Add
   a) 2.97 + 16.348
   b) \((-0.706) + (-0.58)\)

10. Show how to set up the problem 52.4 – 3.692 to calculate by hand, but do not subtract.

11. Subtract
   a) 9.5 – 7.681
   b) 4 – 1.23

12. Compute
    a) \(11.2 - (-4.7)\)
    b) \(-4.38 + 15.2\)
    c) \(-15.8 - 3.2\)

13. Multiply
    a) \((-5.76) \times (-3.2)\)
    b) \(18.4 \times (-0.009)\)

14. Divide
    a) \(37.31 \div (-9.1)\)
    b) \(7.854 \div 0.43\) and round to the nearest tenth

15. Convert \(\frac{6}{7}\) to a decimal and round the answer to the nearest hundredth.

16. Evaluate
    a) \(26.13 + 84.94 + 6.2\)
    b) \((7.1 - 9.5)^2 \times 0.4\)

17. Convert
    a) \(8562 \text{ cm to m}\)
    b) \(15.6 \text{ L to mL}\)
    c) \(82.304 \text{ km to m}\)
    d) \(520 \text{ g to kg}\)

18. Solve each application problem.
    a) Your phone bill is $35.69 per month. What is your total cost for one year?
    b) April drives 5.6 miles from home to the Daycare Center to drop off her son. Then she drives 8.9 miles to work. What is the total mileage for April’s morning commute?
    c) Dave had $476.80 in his account. If he deposits a check for $154.92, then withdraws $75.50, what is Dave’s new account balance?
19. Solve each geometry problem.
   a) Find the perimeter of the trapezoid.
   b) Find the area of the rectangle.
   c) Find the area of the triangle.
   d) Find the circumference of the circle. Use \( \pi = 3.14 \). Round to the nearest tenth.
   e) Find the area of the circle. Use \( \pi = 3.14 \). Round to the nearest hundredth.

20. Use the data table below to answer each question.
   a) How much thicker is Sample 1 compared to Sample 8? Round the answer to the hundredths place.
   b) What is the mean Concentration for Samples 1, 2, 3, 4, and 5?
   c) What is the median Concentration for Samples 1, 2, 3, and 4?
   d) What is the mode Concentration for Samples 1, 2, 3, 4, and 5?

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Thickness (cm)</th>
<th>Temperature (°C)</th>
<th>Concentration (g/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.174</td>
<td>82</td>
<td>0.066</td>
</tr>
<tr>
<td>2</td>
<td>1.8774</td>
<td>77</td>
<td>0.071</td>
</tr>
<tr>
<td>3</td>
<td>1.8774</td>
<td>77</td>
<td>0.072</td>
</tr>
<tr>
<td>4</td>
<td>1.9762</td>
<td>79</td>
<td>0.069</td>
</tr>
<tr>
<td>5</td>
<td>2.0266</td>
<td>80</td>
<td>0.071</td>
</tr>
<tr>
<td>6</td>
<td>2.0994</td>
<td>81</td>
<td>0.066</td>
</tr>
<tr>
<td>7</td>
<td>1.9468</td>
<td>78</td>
<td>0.067</td>
</tr>
<tr>
<td>8</td>
<td>1.8972</td>
<td>77</td>
<td>0.071</td>
</tr>
<tr>
<td>9</td>
<td>1.9169</td>
<td>77</td>
<td>0.07</td>
</tr>
<tr>
<td>10</td>
<td>2.0692</td>
<td>80</td>
<td>0.066</td>
</tr>
</tbody>
</table>

Adapted From: https://controls.engin.umich.edu/wiki/images

Mixed Review

21) Simplify \( \frac{30}{42} \)
22) Convert \( 9\frac{1}{8} \) to an improper fraction.
23) Multiply \( 3\frac{3}{5} \times \frac{10}{27} \)
24) Divide \( \left( -3\frac{6}{7} \right) \div (-12) \)
25) Add \( 1\frac{2}{3} + \frac{5}{8} \)
26) Subtract \( 7\frac{1}{6} - 4\frac{9}{10} \)
27) Convert 16.5 yards to feet.
28) Convert 7200 seconds to hours.
29) Evaluate \( 93.6 \div \left| -102 + 63 \right| \times \sqrt{4} \)
30) Evaluate \( -7^2 + (34 - 126) \times 5^0 \)
31) Translate the phrase into a math expression and find its value.
   a) The product of 2 cubed and \( \frac{2}{7} \)
   b) \( 5\frac{1}{4} \) less than the sum of \(-27\) and \(38\)
32) Find the volume of a cube with side 3.2 cm.
### Chapter 4 Review Answers

1. a) 5  
b) 3  
2. <  
3. 6.89, 6.9, 6.903, 6.91  
4. a) 0.06  
b) 500  
5. a) 7412.9  
b) 7412.89  
6. a) \( \frac{7}{10} \)  
b) \( \frac{16}{25} \)  
7. a) 0.019  
b) 1.15  
8. \[
\begin{align*}
685.0 \\
+ & 1.7
\end{align*}
\] 
9. a) 19.318  
b) –1.286  
10. \[
\frac{52.400}{3.692}
\] 
11. a) 1.819  
b) 2.77  
12. a) 15.9  
b) 10.82  
c) –19  
13. a) 18.432  
b) –0.1656  
14. a) –4.1  
b) 18.3  
15. 0.86  
16. a) 39.83  
b) 2.304  
17. a) 85.62 m  
b) 15,600 mL  
c) 82,304 m  
d) 0.52 kg  
18. a) $428.28  
b) 14.5 miles  
c) $556.22  
19. a) 20.58 ft  
b) 17.52 cm²  
c) 7.2 in²  
d) 38.9 m  
e) 58.06 ft²  
20. a) 0.28 cm  
b) 0.0698 g/L  
c) 0.07 g/L  
d) 0.071 g/L  
21. \( \frac{5}{7} \)  
22. \( \frac{73}{8} \)  
23. \( \frac{4}{3} = 1 \frac{1}{3} \)  
24. \( \frac{73}{8} = 9 \frac{1}{8} \)  
25. \( \frac{55}{24} = 2 \frac{7}{24} \)  
26. \( \frac{34}{15} = 2 \frac{4}{15} \)  
27. 49.5 ft  
28. 2 hours  
29. 4.8  
30. –141  
31. a) \( 2^3 \times \frac{2}{7} = \frac{16}{7} = 2 \frac{2}{7} \)  
b) \( (-27 + 38) - 5 \frac{1}{4} = 23 \frac{3}{4} = 5 \frac{3}{4} \)  
32. 32.768 cm³
1. Evaluate $4^0 - 5(-2)^3 + |4 - 6| - \sqrt{64}$

2. A diver descended 45 feet into the water, then rose 15 feet, and then descended another 22 feet. What is the diver’s depth in the water now?

3. A service technician charges $69 for the service call as well as $23 per hour on the job. What is the total cost for a repair that takes 4 hours?

4. Simplify $\frac{36}{48}$

5. Convert $2\frac{5}{7}$ to an improper fraction.

6. Write $\frac{28}{12}$ as a mixed number in simplest form.

7. Multiply $\left(-\frac{8}{15}\right) \times \left(-\frac{25}{36}\right)$

8. Divide $\left(4\frac{2}{3}\right) \div \left(-2\frac{8}{9}\right)$

9. Evaluate $\left(-1\frac{3}{5}\right)^3$

10. Add $\left(-\frac{7}{10}\right) + \left(-\frac{5}{6}\right)$

11. Subtract $8\frac{3}{8} - 2\frac{5}{6}$

12. Evaluate $\frac{-2}{3} + \frac{1}{2} - \left(\frac{1}{3}\right)^2$

13. Convert $2\frac{1}{4}$ pounds to ounces.

14. Convert 80 pints to gallons.

15. Translate the word phrase into a math expression and find the value.

   the sum of 5 squared and $\frac{3}{5}$

16. Each lap around a stadium track is $\frac{2}{3}$ mile. How many laps would a runner have to complete to get a 20-mile workout?

17. It rained $5\frac{1}{6}$ inches on Friday and $2\frac{1}{8}$ inches on Sunday. What was the total amount of rainfall those two days?

18. Find the perimeter of the trapezoid.

19. Find the area of the rectangle.

20. Find the area of the circle. Use $\pi = \frac{22}{7}$
21. Write 2.75 as a fraction in simplest form.

22. Write $\frac{19}{1000}$ as a decimal.

23. Convert $\frac{9}{14}$ to a decimal and round the answer to the thousandths place.

24. Estimate 0.038

25. Compute $-5.98 + 7.62$

26. Compute and round the answer to the hundredths place.
   $(-22.45) \div (-0.37)$

27. Evaluate $-1.5^2 - 12.4 \div 2 \times 1.6$

28. Convert 2.4 cm to m.

29. George has $731.68 in his account. If he deposits a check for $45.83 and then makes a withdrawal for $61.09, what is his account balance?

30. A painter spent 12.5 hours on a project and got paid $121.25. How much did he get paid per hour?

31. Determine the volume of a cube with side of length 4.2 yards.

32. Calculate the area of the triangle and round the answer to the tenths place.

33. Calculate the circumference of the circle. Use $\pi = 3.14$.

34. Use the data table below to answer the questions that follow.
   a) Who had the most playing time in the April 23rd game?
   b) How much more playing time did Wade have than Bosh in the April 25th game?
   c) What was Allen’s mean playing time in these 4 games?
   d) What was the median playing time for these players in the April 21st game?
   e) What was the mode playing time for Bosh?

<table>
<thead>
<tr>
<th>BASKETBALL PLAYER</th>
<th>APRIL 21ST</th>
<th>APRIL 23RD</th>
<th>APRIL 25TH</th>
<th>APRIL 28TH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ray Allen</td>
<td>28.93</td>
<td>27.33</td>
<td>30.22</td>
<td>29.00</td>
</tr>
<tr>
<td>Chris Bosh</td>
<td>27.25</td>
<td>32.48</td>
<td>32.10</td>
<td>28.62</td>
</tr>
<tr>
<td>LeBron James</td>
<td>34.52</td>
<td>38.60</td>
<td>32.80</td>
<td>41.10</td>
</tr>
<tr>
<td>Dwayne Wade</td>
<td>32.38</td>
<td>32.35</td>
<td>35.98</td>
<td>0</td>
</tr>
</tbody>
</table>

MINUTES PLAYED PER GAME
1. 35
2. –52 feet
3. $161
4. \( \frac{3}{4} \)
5. \( \frac{19}{7} \)
6. \( 2 \frac{1}{3} \)
7. \( \frac{10}{27} \)
8. \( -\frac{21}{13} = -1 \frac{8}{13} \)
9. \( -\frac{512}{125} = -4 \frac{12}{125} \)
10. \( -\frac{23}{15} = -1 \frac{8}{15} \)
11. \( \frac{513}{24} \)
12. \( -\frac{5}{9} \)
13. 36 ounces
14. 10 gallons
15. \( 5^2 + \frac{3}{5} = 25 \frac{3}{5} \)
16. 30
17. \( 3 \frac{23}{24} \) inches
18. \( 20 \frac{1}{7} \) km
19. \( \frac{50}{21} \text{ ft}^2 = 2 \frac{8}{21} \text{ ft}^2 \)
20. 1386 \( \text{cm}^2 \)
21. \( \frac{11}{4} = 2 \frac{3}{4} \)
22. 0.019
23. 0.643
24. 0.04
25. 1.64
26. 60.68
27. –12.17
28. 0.024 m
29. $716.42
30. $9.70
31. 74.088 \( \text{yd}^3 \)
32. 19.3 \( \text{m}^2 \)
33. 28.26 in
34. a) LeBron James
   b) 3.88 min
   c) 28.87 min
   d) 30.655 min
   e) None