Course 1 Students,
To help you prepare for the upcoming school year we have identified exercises representing material you already know that you should be ready to use again when the school year begins. Knowledge of this content will be important for your success in Math Course 1.

The exercises review and practice skills you learned in 5th grade.

The following skills are included:
- Understanding Decimals
- Understanding Fractions
- Adding and Subtracting Fractions
- Operations with Whole Numbers
- Operations with Fractions
- Operations with Decimals

To assist your efforts you may find it helpful to visit the Khan Academy. [https://www.khanacademy.org/math/pre-algebra](https://www.khanacademy.org/math/pre-algebra)
This website provides free tutorial support for all levels of mathematics.

Thank you.
Skill 14

Represent Decimals

Example A
This model represents one whole, or 1.
Words: one
Fraction: 1
Decimal: 1.0

Example B
The whole is divided into 10 equal parts. 7 out of 10 parts are shaded.
So, 7 tenths are shaded.
Words: seven tenths
Fraction: \( \frac{7}{10} \)
Decimal: 0.7

Example C
The whole is divided into 100 equal parts. 23 out of 100 parts are shaded.
So, 23 hundredths are shaded.
Words: twenty-three hundredths
Fraction: \( \frac{23}{100} \)
Decimal: 0.23

Example D
This model represents 1 whole and 7 tenths.
Words: one and seven tenths
Mixed Number: 1 \( \frac{7}{10} \)
Decimal: 1.7

Try These
Shade the squares. Write the fraction or mixed number. Write the decimal.

1. One and four tenths
   Fraction: \( \frac{14}{10} \)
   Decimal: 1.4

2. Seven tenths
   Fraction: \( \frac{7}{10} \)
   Decimal: 0.7

3. Twenty-three hundredths
   Fraction: \( \frac{23}{100} \)
   Decimal: 0.23

4. One and thirty-five hundredths
   Mixed Number: 1 \( \frac{35}{100} \)
   Decimal: 1.35
Think:
1 tenth is 1 of 10 equal parts
1 hundredth is 1 of 100 equal parts.

Words: one and twenty-six hundredths

Mixed Number: \(1 \frac{26}{100}\)

Decimal: 1.26

Shade the squares. Write the fractions or mixed numbers, and decimals.

1. 3 tenths
2. 7 tenths
3. 1 tenth
4. 1 and 5 tenths
5. 17 hundredths
6. 70 hundredths
7. 4 hundredths
8. 1 and 65 hundredths

9. 9 tenths
10. 1 and 6 tenths
11. 82 hundredths
12. 1 and 37 hundredths

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Write and Read Decimals

You can use a place-value chart to help you read and write decimals.

**Example A**

<table>
<thead>
<tr>
<th>tens</th>
<th>ones</th>
<th>tenths</th>
<th>hundredths</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>6</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

Expanded Form: \(60 + 6 + 0.4 + 0.03\)
Standard Form: 66.43
Word Form: 66 and 43 hundredths

**Try These**

Write the decimal in standard and word form.

1.

<table>
<thead>
<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
<th>tenths</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>2</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

Think: \(800 + 20 + 6 + 0.3\)
Standard Form: ________
Word Form: ________ and ________ tenths

2.

<table>
<thead>
<tr>
<th>thousands</th>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
<th>tenths</th>
<th>hundredths</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Think: \(4,000 + 300 + 50 + 1 + 0.2 + 0.02\)
Standard Form: ________
Word Form: ________ thousand, ________ and ________ hundredths
Practice on Your Own

Think:
Use place value to help you write and read decimals.
Use a comma to separate thousands from hundreds.

Expanded Form: 600,000 + 10,000 + 1,000 + 300 + 40 + 5 + 0.8
Standard Form: 611,345.8
Word Form: 611 thousand, 345 and 8 tenths

Write the decimal in standard form and word form.

1. Think: 20 + 3 + 0.5 + 0.07
   Standard Form: _______
   Word Form: _______ and _______ hundredths

2. Think: 100 + 70 + 7 + 0.6 + 0.08
   Standard Form: _______
   Word Form: _______ and _______ hundredths

3. 800 + 90 + 0 + 0.3
   Standard Form: _______
   Word Form: _______

4. 100,000 + 6,000 + 400 + 30 + 4 + 0.1 + 0.09
   Standard Form: _______
   Word Form: _______

Write the decimal in standard form.

5. 169 and 45 hundredths
   Standard Form: _______

6. 2 thousand, 165 and 5 tenths
   Standard Form: _______

Check

Write the decimal in word form.
A fraction is a number that names part of a whole or part of a group.

**Model Fractions**

**Part of a Whole**

The whole is divided into 9 equal parts. 3 out of 9 parts are shaded. So, \(\frac{3}{9}\) of the square is shaded.

**Part of a Group**

There are 9 circles in this group. The group is divided into 3 equal parts. 1 out of 3 parts is shaded. So, \(\frac{1}{3}\) of the group is shaded.

**Part of a Group**

There are 7 parts in the group. 3 out of 7 parts are shaded. So, \(\frac{3}{7}\) of the group is shaded.

Try These

1. Complete.

- \(\frac{3}{7}\) of the circles are shaded.

- \(\frac{1}{3}\) of the group is shaded.

- \(\frac{3}{9}\) of the square is shaded.
Practice on Your Own

There are 10 equal parts in the whole. 4 out of 10 equal parts are shaded.

\[ \frac{4}{10} \text{ of the rectangle is shaded.} \]

Complete.

1. [Diagram of a circle divided into 10 parts, with 4 parts shaded]

2. [Diagram of a group divided into 5 parts, with 3 parts shaded]

3. [Diagram of a group divided into 5 parts, with 3 parts shaded]

Write the fraction for the shaded part.

7. [Diagram of a circle divided into 6 parts, with 3 parts shaded]

8. [Diagram of a group divided into 5 parts, with 3 parts shaded]

9. [Diagram of a group divided into 8 parts, with 5 parts shaded]

Check

Write the fraction for the shaded part.

10. [Diagram of a group divided into 6 parts, with 3 parts shaded]

11. [Diagram of a group divided into 8 parts, with 5 parts shaded]

12. [Diagram of a group divided into 10 parts, with 3 parts shaded]
Write Equivalent Fractions

Model A
Make a model to show thirds. Shade of the model to show sixths. and represent the same size part. So, \( \frac{1}{3} = \frac{2}{6} \).

Model B
Multiply the numerator and the denominator by the same number to find an equivalent fraction. So, \( \frac{2}{6} = \frac{4}{12} \).

Model C
Divide the numerator and the denominator by the same number to find an equivalent fraction. So, \( \frac{2}{6} = \frac{1}{3} \).

Try These
Write the equivalent fraction.

Go to the next side.
Practice on Your Own

Think:
Multiply or divide to find an equivalent fraction.

Write the equivalent fraction.

1. \(\frac{1}{5} = \frac{?}{10}\)
2. \(\frac{1}{4} = \frac{?}{8}\)
3. \(\frac{5}{8} = \frac{?}{16}\)
4. \(\frac{2}{3} = \frac{?}{9}\)
5. \(\frac{1}{2} = \frac{?}{6}\)
6. \(\frac{3}{4} = \frac{?}{12}\)
7. \(\frac{1}{6} = \frac{?}{12}\)
8. \(\frac{2}{5} = \frac{?}{15}\)
9. \(\frac{6}{16} = \frac{?}{8}\)
10. \(\frac{12}{12} = \frac{?}{4}\)
11. \(\frac{2}{18} = \frac{?}{9}\)
12. \(\frac{4}{20} = \frac{?}{5}\)
13. \(\frac{4}{4} = \frac{?}{8}\)
14. \(\frac{7}{14} = \frac{?}{2}\)
15. \(\frac{15}{25} = \frac{?}{5}\)
16. \(\frac{1}{3} = \frac{?}{21}\)

Check

Write the equivalent fraction.

17. \(\frac{1}{2} = \frac{?}{10}\)
18. \(\frac{8}{12} = \frac{?}{6}\)
19. \(\frac{7}{21} = \frac{?}{3}\)
20. \(\frac{7}{8} = \frac{?}{16}\)
Write an Improper Fraction as a Mixed Number

You can write an improper fraction as a mixed number. Write the fraction $\frac{9}{4}$ as a mixed number.

Step 1
Model $\frac{9}{4}$ with circles for $\frac{1}{4}$.

Step 2
Group the $\frac{1}{4}$ parts as wholes and parts.

Step 3
Write the sum as a mixed number.

So, $\frac{9}{4}$ written as a mixed number is $2\frac{1}{4}$.

Try These

Write each improper fraction as a mixed number.

1. $\frac{3}{2} = \frac{2}{2} + \frac{1}{2}
   = \quad + \quad \frac{1}{2}
   = \quad$

2. $\frac{5}{3} = \frac{3}{3} + \frac{2}{3}
   = \quad + \quad \frac{2}{3}
   = \quad$

3. $\frac{11}{4} = \frac{4}{4} + \frac{3}{4}
   = \quad + \quad \frac{3}{4}
   = \quad$

Go to the next side.
**Practice on Your Own**

**Think:**
Find the names for 1 in fraction form. Then add the names for 1 and the fraction. Write the sum as a mixed number.

\[
\frac{12}{5} = \frac{5}{5} + \frac{5}{5} + \frac{2}{5} = 1 + 1 + \frac{2}{5} = 2 + \frac{2}{5} = 2 \frac{2}{5}
\]

---

**Skill 21**

Write each improper fraction as a mixed number.

1. \(\frac{9}{2} = \frac{2}{2} + \frac{2}{2} + \frac{2}{2} + \frac{2}{2} = \quad + \quad + \quad + \quad = \quad + \quad = \quad + \quad = \quad + \quad \)

2. \(\frac{8}{3} = \frac{3}{3} + \frac{3}{3} + \frac{3}{3} = \quad + \quad + \quad = \quad + \quad = \quad + \quad \)

3. \(\frac{15}{4} = \frac{4}{4} + \frac{4}{4} + \frac{4}{4} + \frac{4}{4} = \quad + \quad + \quad + \quad = \quad + \quad = \quad + \quad \)

4. \(\frac{13}{5} = \frac{5}{5} + \frac{5}{5} + \frac{5}{5} = \quad + \quad + \quad = \quad + \quad = \quad + \quad \)

5. \(\frac{7}{2} = \frac{2}{2} + \frac{2}{2} + \frac{2}{2} + \frac{2}{2} = \quad + \quad + \quad + \quad = \quad + \quad + \quad = \quad + \quad \)

6. \(\frac{11}{3} = \frac{3}{3} + \frac{3}{3} + \frac{3}{3} = \quad + \quad + \quad + \quad = \quad + \quad + \quad = \quad + \quad \)

7. \(\frac{15}{8} = \quad + \quad \)

8. \(\frac{24}{5} = \quad + \quad \)

9. \(\frac{19}{6} = \quad + \quad \)

**Check**

Write each improper fraction as a mixed number.

10. \(\frac{25}{8} = \quad + \quad \)

11. \(\frac{27}{10} = \quad + \quad \)

12. \(\frac{17}{4} = \quad + \quad \)
**Write a Mixed Number as a Fraction**

**Step 1**
Write the whole number as a sum of ones.

\[ 3 \frac{1}{2} = 1 + 1 + 1 + \frac{1}{2} \]

**Step 2**
Use the denominator of the fraction to write equivalent fractions for the ones.

\[ 3 \frac{1}{2} = \frac{1}{2} + \frac{1}{2} + \frac{1}{2} \]

\[ = \frac{2}{2} + \frac{2}{2} + \frac{1}{2} \]

**Step 3**
Add the numerators to find the improper fraction.

\[ 3 \frac{1}{2} = 1 + 1 + 1 + \frac{1}{2} \]

\[ = \frac{2}{2} + \frac{2}{2} + \frac{1}{2} \]

\[ = \frac{7}{2} \]

So, the fraction for \( 3 \frac{1}{2} \) is \( \frac{7}{2} \).

**Try These**

Write each mixed number as an improper fraction.

1. \( 2 \frac{1}{3} \)
   \[ 2 \frac{1}{3} = 1 + 1 + \frac{1}{3} \]
   \[ = \frac{3}{3} + \frac{3}{3} + \frac{1}{3} \]
   \[ = \frac{7}{3} \]

2. \( 3 \frac{3}{4} \)
   \[ 3 \frac{3}{4} = 1 + 1 + 1 + \frac{3}{4} \]
   \[ = \frac{4}{4} + \frac{4}{4} + \frac{4}{4} + \frac{3}{4} \]
   \[ = \frac{15}{4} \]

3. \( 1 \frac{4}{5} \)
   \[ 1 \frac{4}{5} = 1 + \frac{4}{5} \]
   \[ = \frac{5}{5} + \frac{4}{5} \]
   \[ = \frac{9}{5} \]
**Practice on Your Own**

**Think:**
Write the whole number as a sum of ones.
Write equivalent fractions for the ones.
Add the numerators to find the fraction.

2\(\frac{2}{5}\) = 1 + 1 + \(\frac{2}{5}\)
\(\begin{align*}
\frac{5}{5} + \frac{5}{5} + \frac{2}{5} \\
= \frac{12}{5}
\end{align*}\)

**Write each mixed number as an improper fraction.**

1. \(4\frac{1}{2}\)

\(4\frac{1}{2} = 1 + 1 + 1 + 1 + \frac{1}{2}\)
\(= \frac{2}{2} + \frac{2}{2} + \frac{2}{2} + \frac{1}{2}\)
\(= \frac{7}{2}\)

2. \(2\frac{3}{4}\)

\(2\frac{3}{4} = 1 + 1 + \frac{3}{4}\)
\(= \frac{4}{4} + \frac{4}{4} + \frac{3}{4}\)
\(= \frac{11}{4}\)

3. \(3\frac{2}{3}\)

\(3\frac{2}{3} = 1 + 1 + \frac{2}{3}\)
\(= \frac{3}{3} + \frac{3}{3} + \frac{2}{3}\)
\(= \frac{8}{3}\)

4. \(3\frac{2}{5}\)

\(3\frac{2}{5} = \ldots + \ldots + \ldots + \ldots\)
\(= \frac{5}{5} + \frac{5}{5} + \frac{2}{5}\)
\(= \frac{12}{5}\)

5. \(2\frac{1}{8}\)

\(2\frac{1}{8} = \ldots + \ldots + \ldots\)
\(= \frac{2}{8} + \frac{2}{8} + \frac{1}{8}\)
\(= \frac{5}{8}\)

6. \(3\frac{5}{6}\)

\(3\frac{5}{6} = \ldots + \ldots + \ldots + \ldots\)
\(= \frac{5}{6} + \frac{5}{6} + \frac{5}{6}\)
\(= \frac{15}{6}\)

7. \(5\frac{3}{4}\)

8. \(8\frac{4}{5}\)

9. \(6\frac{2}{3}\)

**Check**

**Write each mixed number as an improper fraction.**

10. \(5\frac{3}{4}\)

11. \(6\frac{1}{8}\)

12. \(4\frac{3}{5}\)
Add and Subtract Like Fractions

Before you add or subtract fractions, compare the denominators to be sure they are the same.

Add Like Fractions

Find \( \frac{2}{7} + \frac{3}{7} \).

Step 1 The denominators are the same. Add the numerators.

\( \frac{2}{7} + \frac{3}{7} = \frac{5}{7} \)

Step 2 Write the sum over the denominator.

\( \frac{5}{7} \)

Subtract Like Fractions

Find \( \frac{7}{8} - \frac{4}{8} \).

Step 1 The denominators are the same. Subtract the numerators.

\( \frac{7}{8} - \frac{4}{8} = \frac{3}{8} \)

Step 2 Write the difference over the denominator.

\( \frac{3}{8} \)

Try These

Add or subtract. Write each answer in simplest form.

\( \frac{3}{5} + \frac{1}{5} \)

1. Add: \( \frac{3}{5} + \frac{1}{5} = \frac{4}{5} \)

Try These

Add or subtract. Write each answer in simplest form.

\( \frac{6}{7} - \frac{4}{7} \)

2. Subtract numerators: \( \frac{6}{7} - \frac{4}{7} = \frac{2}{7} \)

Try These

Add or subtract. Write each answer in simplest form.

\( \frac{7}{8} - \frac{3}{8} \)

3. Subtract numerators: \( \frac{7}{8} - \frac{3}{8} = \frac{4}{8} \)

Try These

Add or subtract. Write each answer in simplest form.

\( \frac{5}{3} + \frac{1}{3} \)

4. Add: \( \frac{5}{3} + \frac{1}{3} = \frac{6}{3} = 2 \)
Practice on Your Own

Add like fractions. \( \frac{3}{8} + \frac{1}{8} = \)

The denominators are the same.

So, add the numerators.
Answer is not in simplest form.

\[ \frac{3}{8} + \frac{1}{8} = \frac{4}{8} \]

Subtract like fractions. \( \frac{8}{9} - \frac{2}{9} = \)

The denominators are the same.
So, subtract the numerators.
Answer is not in simplest form.

\[ \frac{8}{9} - \frac{2}{9} = \frac{6}{9} \]

\[ \frac{8}{9} - \frac{2}{9} = \frac{4}{9} \]

Add or subtract. Write each answer in simplest form.

1. \( \frac{2}{6} + \frac{3}{6} \)
   Denominators the same? __
   Add:
   
   \[ \frac{2}{6} + \frac{3}{6} = \frac{5}{6} \]
   Simplest form? __

2. \( \frac{4}{5} - \frac{3}{5} \)
   Denominators the same? __
   Subtract:
   
   \[ \frac{4}{5} - \frac{3}{5} = \frac{1}{5} \]
   Simplest form? __

3. \( \frac{7}{10} + \frac{1}{10} \)
   Denominators the same? __
   Add:
   
   \[ \frac{7}{10} + \frac{1}{10} = \frac{8}{10} \]
   Simplest form? __

4. \( \frac{2}{5} + \frac{1}{5} = \)
   Simplest form? __

5. \( \frac{7}{8} - \frac{3}{8} = \)
   Simplest form? __

6. \( \frac{10}{10} - \frac{8}{10} = \)
   Simplest form? __

7. \( \frac{4}{7} - \frac{2}{7} \)

8. \( \frac{1}{9} + \frac{3}{9} \)

9. \( \frac{5}{8} - \frac{1}{8} \)

10. \( \frac{5}{6} + \frac{1}{6} \)

Check

Add or Subtract. Write each answer in simplest form.

11. \( \frac{3}{3} - \frac{2}{3} \)

12. \( \frac{6}{8} + \frac{1}{8} \)

13. \( \frac{8}{9} - \frac{5}{9} \)

14. \( \frac{4}{10} + \frac{4}{10} \)
Remainders

You can express a remainder as a whole number, fraction, or decimal. Find $175 \div 14 = \square$. Show three ways to write the remainder.

1. Write the remainder as a whole number.
   
   Divisor $\rightarrow$ $14 \div 175$
   
   $-14$
   
   $-35$
   
   $-28$
   
   $\text{Remainder} \rightarrow 7$
   
   So, $175 \div 14 = 12 \text{ r } 7$.

2. Write the remainder as a fraction.
   
   $\frac{12}{2}$
   
   $14 \div 175$
   
   $-14$
   
   $-35$
   
   $-28$
   
   $\frac{7}{14} = \frac{1}{2}$
   
   So, $175 \div 14 = 12\frac{1}{2}$

3. Write the remainder as a decimal.
   
   $\div 12.5$
   
   $14 \div 175.0$
   
   $-14$
   
   $-35$
   
   $-28$
   
   $\text{Remainder} \rightarrow 7$
   
   $-70$
   
   $-70$
   
   $0$
   
   So, $175 \div 14 = 12.5$

Try These

1. Divide. Write the remainder as a whole number.
   
   $4 \div 26$
   
   $-24$
   
   $2$

2. Divide. Write the remainder as a fraction.
   
   $12 \div 50$
   
   $-12$
   
   $-30$
   
   $-20$

3. Divide. Write the remainder as a decimal.
   
   $12 \div 67$
   
   $-12$
   
   $-21$
   
   $-29$
   
   $-28$
   
   $-27$

Go to the next side.
Practice on Your Own

You can write a remainder as a:
• whole number
• fraction
• decimal

Find $54 \div 8$. Write the remainder as a decimal.

Divide. Write the remainder as a whole number.

1. $5 \overline{)4 7}$
   
   4
   
   3

2. $11 \overline{)1 9 0}$
   
   18
   
   1

3. $16 \overline{)1 9 4 1}$
   
   160
   
   19

Divide. Write the remainder as a fraction.

4. $4 \overline{)3 4}$

5. $16 \overline{)4 0 4}$

6. $37 \overline{)1 2 9 9}$

Divide. Write the remainder as a decimal.

7. $4 \overline{)2 7 . 0}$

8. $15 \overline{)7 8 . 3}$

9. $36 \overline{)5 4 . 9 0}$

Check

Show your work on a separate piece of paper.

10. Divide. Write the remainder as a whole number.

11. Divide. Write the remainder as a fraction.

12. Divide. Write the remainder as a decimal.

6$\overline{)7 7}$

12$\overline{)1 8 4}$

18$\overline{)3 6 9}$
Whole Number Operations

**Add, subtract, multiply, or divide.**

### Find the sum.

<table>
<thead>
<tr>
<th>235 + 47</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 235</td>
</tr>
<tr>
<td>+ 47</td>
</tr>
<tr>
<td>282</td>
</tr>
</tbody>
</table>

Regroup 10 ones as 1 ten.

### Find the difference.

<table>
<thead>
<tr>
<th>382 − 56</th>
</tr>
</thead>
<tbody>
<tr>
<td>382</td>
</tr>
<tr>
<td>− 56</td>
</tr>
<tr>
<td>326</td>
</tr>
</tbody>
</table>

Think: 6 > 2
Regroup 1 ten as 10 ones.
1 ten + 2 ones = 12 ones
Subtract: 12 − 6

### Find the product.

<table>
<thead>
<tr>
<th>42 × 54</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
</tr>
<tr>
<td>× 54</td>
</tr>
<tr>
<td>168</td>
</tr>
<tr>
<td>2,100</td>
</tr>
<tr>
<td>2,268</td>
</tr>
</tbody>
</table>

Think: Add the partial products.

### Find the quotient.

<table>
<thead>
<tr>
<th>363 ÷ 48</th>
</tr>
</thead>
<tbody>
<tr>
<td>363</td>
</tr>
<tr>
<td>− 48</td>
</tr>
<tr>
<td>315</td>
</tr>
<tr>
<td>324</td>
</tr>
</tbody>
</table>

Estimate the quotient.

- **basic fact:** 48
- **compatible numbers:** 50 and 350

---

**Try These**

1. **Find the sum.**
   
   418 + 37
   
   4 1 8
   
   + 3 7
   
   4 5 5

2. **Find the difference.**
   
   375 − 126
   
   3 7 5
   
   − 1 2 6
   
   2 4 9

3. **Find the product.**
   
   93 × 72
   
   9 3
   
   × 7 2
   
   6 9 0
   
   6 5 4

4. **Find the quotient.**
   
   5 8 4 9 8
   
   − 4 8 1
   
   1 0 7
   
   − 7 2 5
   
   3 2 3

Go to the next side.
Practice on Your Own

Find the difference.

Think:
Do you need to regroup?

\[
\begin{align*}
400 & \quad - \quad 52 \\
\hline
348 & \\
\end{align*}
\]

Find the product. Estimate the quotient and then divide.

Look for a basic fact.

\[
\begin{align*}
310 \times 62 & \quad = \quad 2 \times 310 \\
18,600 & \quad + \quad 60 \times 310 \\
19,220 & \\
\end{align*}
\]

Add, subtract, multiply, or divide.

\[
\begin{align*}
1 & \quad 4 \quad 8 \\
+ \quad 2 \quad 7 & \quad \underline{\quad \quad} \\
\hline
\end{align*}
\]

\[
\begin{align*}
2 & \quad 6 \quad 5 \\
+ \quad 4 \quad 8 & \quad \underline{\quad \quad} \\
\hline
\end{align*}
\]

\[
\begin{align*}
427 & \quad + \quad 139 \\
\hline
\end{align*}
\]

\[
\begin{align*}
164 & \quad + \quad 24 \\
\hline
\end{align*}
\]

\[
\begin{align*}
7 & \quad 3 \\
- \quad 4 \quad 5 & \quad \underline{\quad \quad} \\
\hline
\end{align*}
\]

\[
\begin{align*}
4,3 & \quad 8 \\
- \quad 6 \quad 9 & \quad \underline{\quad \quad} \\
\hline
\end{align*}
\]

\[
\begin{align*}
613 & \quad - \quad 125 \\
\hline
\end{align*}
\]

\[
\begin{align*}
800 & \quad - \quad 247 \\
\hline
\end{align*}
\]

\[
\begin{align*}
7 & \quad 2 \\
\times \quad 4 \quad 5 & \quad \underline{\quad \quad} \\
\hline
\end{align*}
\]

\[
\begin{align*}
1 & \quad 2 \quad 8 \\
\times \quad 3 \quad 6 & \quad \underline{\quad \quad} \\
\hline
\end{align*}
\]

\[
\begin{align*}
409 & \quad \times \quad 87 \\
\hline
\end{align*}
\]

\[
\begin{align*}
684 & \quad \times \quad 20 \\
\hline
\end{align*}
\]

\[
\begin{align*}
23 & \quad 1 \quad 3 \quad 3 \quad 4 \\
- \quad \underline{\quad \quad} \\
\hline
\end{align*}
\]

\[
\begin{align*}
8 & \quad 1 \quad 9 \quad 4 \\
- \quad \underline{\quad \quad} \\
\hline
\end{align*}
\]

\[
\begin{align*}
48 & \quad \div \quad 1,584 \\
\hline
\end{align*}
\]

\[
\begin{align*}
7 & \quad 2,272 \\
\hline
\end{align*}
\]

Check

Add, subtract, multiply, or divide.

\[
\begin{align*}
17 & \quad 357 \\
+ \quad 64 & \quad \underline{\quad \quad} \\
\hline
\end{align*}
\]

\[
\begin{align*}
18 & \quad 835 \\
- \quad 96 & \quad \underline{\quad \quad} \\
\hline
\end{align*}
\]

\[
\begin{align*}
19 & \quad 207 \\
\times \quad 35 & \quad \underline{\quad \quad} \\
\hline
\end{align*}
\]

\[
\begin{align*}
20 & \quad 5 \quad 375 \\
\hline
\end{align*}
\]
Model Percents

Percent means "per hundred". Percent is a ratio of a number to 100. Use a 10 x 10 grid to represent percents.

There are 100 squares in the grid.

Ratio: \( \frac{\text{shaded squares}}{\text{total squares}} = \frac{100}{100} \)

So, 100% of the grid is shaded.

In this grid, 1 out of 100 squares is shaded.

Ratio: \( \frac{\text{shaded squares}}{\text{total squares}} = \frac{1}{100} \)

Percent: 1%
So, 1% of the grid is shaded.

In this grid, 20 out of 100 squares are shaded.

Ratio: \( \frac{\text{shaded squares}}{\text{total squares}} = \frac{20}{100} \)

Percent: 20%
So, 20% of the grid is shaded.

In this grid, 73 out of 100 squares are shaded.

Ratio: \( \frac{\text{shaded squares}}{\text{total squares}} = \frac{73}{100} \)

Percent: 73%
So, 73% of the grid is shaded.

Try These

Write the ratio of shaded squares to total squares. Write the percent that tells what part is shaded.

1. Ratio: \( \frac{\text{shaded}}{\text{total}} = \frac{\square}{100} \)
Percent: ___%

2. Ratio: \( \frac{\text{shaded}}{\text{total}} = \frac{\square}{100} \)
Percent: ___%

3. Ratio: \( \frac{\text{shaded}}{\text{total}} = \frac{\square}{100} \)
Percent: ___%

4. Ratio: \( \frac{\text{shaded}}{\text{total}} = \frac{\square}{100} \)
Percent: ___%
A percent is a ratio of a number to 100.

50 out of 100 squares are shaded. So, 50% of the squares are shaded.

Write the ratio of shaded squares to total squares. Write the percent that tells what part is shaded.

1. Ratio: \( \frac{\text{shaded}}{\text{total}} = \frac{\square}{100} \)
   Percent: ___%

2. Ratio: \( \frac{\text{shaded}}{\text{total}} = \frac{\square}{100} \)
   Percent: ___%

3. Ratio: \( \frac{\text{shaded}}{\text{total}} = \frac{\square}{100} \)
   Percent: ___%

Write the percent for the shaded part.

4. Ratio: \( \frac{\text{shaded}}{\text{total}} = \frac{\square}{100} \)
   Percent: ___%

5. Ratio: \( \frac{\text{shaded}}{\text{total}} = \frac{\square}{100} \)
   Percent: ___%

6. Ratio: \( \frac{\text{shaded}}{\text{total}} = \frac{\square}{100} \)
   Percent: ___%

Check

Write the percent for the shaded part.

7. ___%

8. ___%

9. ___%
Percents and Decimals

**Percent** is a ratio of a number to 100. When you write a percent as a ratio in fraction form, you use a denominator of 100. You can use this fact to write a percent as a decimal.

**Example A  Percent as a Decimal**
- Write 15% as a decimal.  
  15% written as a ratio is 15 out of 100 or \( \frac{15}{100} \).  
  Fifteen hundredths written as a decimal is 0.15.
- Write 103% as a decimal.  
  **Think:** 103% = 100% + 3%  
  \[
  \begin{array}{c}
  100 \\
  100 \\
  100 \\
  100 \\
  100 \\
  \end{array}
  \]
  One and three hundredths written as a decimal is 1.03.

**Example B  Decimal as a Percent**
- Write 0.38 as a percent.  
  **Think:** thirty-eight hundredths  
  **Ratio:** \( \frac{38}{100} \)  
  **Percent:** 38%
- Write 0.01 as a percent.  
  **Think:** one hundredth  
  **Ratio:** \( \frac{1}{100} \)  
  **Percent:** 1%
- Write 1.5 as a percent.  
  **Think:** one and five tenths or one and fifty hundredths  
  **Ratio:** \( \frac{150}{100} \)  
  **Percent:** 150%

**Try These**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 1 | 30%  
  ↓  
  ____ out of 100  
  ____ hundredths  
  0 . ____ |
| 2 | 9%  
  ↓  
  ____ out of 100  
  ____ hundredths  
  0.0 ____ |
| 3 | 0.4  
  ↓  
  ____ hundredths  
  \( \frac{□}{100} \) or ____ % |
| 4 | 1.25  
  ↓  
  ____ and ____ hundredths  
  \( \frac{□}{100} \) or ____ % |

Percent means “per hundred.”
Practice on Your Own

Write 125% as a decimal.

\[125\% = \frac{100\% + 25\%}{100 + \frac{25}{100}}\]

One and twenty-five hundredths written as a decimal is 1.25.

Write 0.06 as a percent.

\[
\frac{6}{100}
\]

Percent: 6%

Skill 30

Write the percent as a decimal.

\[\text{37\%} \quad \text{60\%} \quad \text{2\%} \quad \text{75\%} \]

\[
\frac{\text{37}}{100} \quad \frac{\text{60}}{100} \quad \frac{\text{2}}{100} \quad \frac{\text{75}}{100}
\]

Write the decimal as a percent.

\[\text{0.55} \quad \text{0.08} \quad \text{0.4} \quad \text{2.45} \]

Write the percent as a decimal.

\[\text{99\%} \quad \text{20\%} \quad \text{5\%} \quad \text{100\%} \]

Write the decimal as a percent.

\[\text{0.86} \quad \text{0.01} \quad \text{0.3} \quad \text{2.1} \]

Write the percent as a decimal or the decimal as a percent

\[\text{3\%} \quad \text{42\%} \quad \text{0.7} \quad \text{1.5} \]

\[\text{3\%} \quad \text{42\%} \quad \text{0.7} \quad \text{1.5} \]
Decimal Operations

Adding Decimals
Find 8.93 + 2.46.
Rewrite the problem so the decimal points are aligned.
8.93
+2.46 add
11.39

Subtracting Decimals
Find 34.5 - 17.32.
Rewrite the problem so the decimal points are aligned.
34.5
-17.32
17.18

If necessary, add zeros as placeholders and regroup when subtracting.

Multiplying Decimals
Find 3.24 \times 0.3.
Rewrite the problem.
Determine the number of decimal places in the product.
3.24 \rightarrow 2 \text{ decimal places}
0.3 \rightarrow 1 \text{ decimal place}
0.972 \rightarrow 3 \text{ decimal places}

Dividing Decimals
Find 1.75 \div 3.5.
Rewrite the problem.
Change the divisor to a whole number and move the decimal point in the dividend.
3.5 \rightarrow 1 \text{ whole number}
7.5 \rightarrow 0 \text{ placeholders}
35 \rightarrow 0

Try These

Solve.

1. 17.23 + 54.39
   17.23 + 54.39 Align decimals.

2. 45.6 - 24.9
   45.6 - 24.9 Align decimals.

3. 4.23 \times 1.2
   4.23 \rightarrow \square \text{ decimal places}
   \times 1.2 \rightarrow \square \text{ decimal place}
   \square \text{ decimal places}

4. 6.11 \div 0.65
   0.65 \div 0.65 Move the decimal point.

Go to the next side.
Practice on Your Own

Think: To add and subtract decimals, align the decimal points.

Think: When multiplying decimals, determine the number of place values the product will have.

Think: When dividing decimals, remember to move the decimal point so you are dividing by a whole number.

Solve.

1. \[74.25 + 21.38\]
   \[74.25\]
   \[=\]
   \[+21.38\]

2. \[2.17 \times 0.4\]
   \[=\]
   \[2.17\]
   \[=\]
   \[\times 0.4\]
   \[=\]
   \[\square \text{decimal place}\]
   \[\square \text{decimal place}\]

3. \[7.77 \div 2.1\]
   \[\text{move decimal}\]
   \[2.1\]
   \[\downarrow\]
   \[7.77\]

4. \[9.73 + 3.688\]

5. \[80.2 - 4.57\]

6. \[6.45 \div 1.2\]

7. \[3.69 \div 0.4\]

8. \[6.1 \times 3.7\]

9. \[0.5 \times 0.85\]

Check

Solve.

10. \[23.81 - 5.4\]

11. \[11.52 \div 3.2\]

12. \[37.4 + 8.01\]

13. \[9.71 - 3.226\]

14. \[0.75 \times 4.1\]

15. \[9.51 \times 0.7\]
**Operations with Fractions**

You can add, subtract, multiply, and divide with fractions.

**Example A** Add. $\frac{3}{4} + \frac{2}{5} = \square$

The denominators are different. **So**, use the LCD to write equivalent fractions.

$$\frac{3}{4} = \frac{3 \times 5}{4 \times 5} = \frac{15}{20}$$

$$\frac{2}{5} = \frac{2 \times 4}{5 \times 4} = \frac{8}{20}$$

Add the numerators.

Simplify the answer. $\frac{23}{20} = 1 \frac{3}{20}$

**So**, $\frac{3}{4} + \frac{2}{5} = 1 \frac{3}{20}$.

**Example C** Multiply. $\frac{3}{6} \times \frac{4}{12} = \square$

Multiply the numerators. Then multiply the denominators.

Divide by GCF, 12.

$$\frac{3 \times 4}{6 \times 12} = \frac{12}{72} = \frac{12 \div 12}{72 \div 12} = \frac{1}{6}$$

**So**, $\frac{3}{6} \times \frac{4}{12} = \frac{1}{6}$.

**Example B** Subtract. $\frac{13}{15} - \frac{2}{3} = \square$

The denominators are different. **So**, use the LCD to write equivalent fractions.

$$\frac{13}{15} \rightarrow \frac{2 \times 5}{3 \times 5} = \frac{10}{15}$$

Subtract the numerators. Simplify the answer. $\frac{3}{15} = \frac{1}{5}$

**So**, $\frac{13}{15} - \frac{2}{3} = \frac{1}{5}$.

**Example D** Divide. $\frac{5}{7} \div \frac{1}{2} = \square$

To divide with fractions, first write the reciprocal of the divisor. Then multiply.

Simplify

$$\frac{5}{7} \div \frac{1}{2} = \frac{5 \times 2}{7} = \frac{10}{7}, \text{ or } 1 \frac{3}{7}$$

**So**, $\frac{5}{7} \div \frac{1}{2} = 1 \frac{3}{7}$.

**Try These**

1. Find $\frac{1}{2} + \frac{2}{5} = \square$.
2. Find $\frac{5}{6} - \frac{1}{3} = \square$.
3. Find $\frac{2}{3} \times \frac{1}{6} = \square$.
4. Find $\frac{4}{7} \div \frac{2}{14} = \square$.

*Go to the next side.*
Find $\frac{6}{7} - \frac{2}{3}$. 
Use the LCD to write equivalent fractions.

LCD is 21.

\[
\frac{6}{7} = \frac{6 \times 3}{7 \times 3} = \frac{18}{21}
\]
\[
\frac{2}{3} = \frac{2 \times 7}{3 \times 7} = \frac{14}{21}
\]

Subtract the numerators.

So, $\frac{6}{7} - \frac{2}{3} = \frac{4}{21}$.

Find $\frac{3}{8} + \frac{1}{6}$.
Write the reciprocal of the divisor.

Multiply.

\[
\frac{3}{8} + \frac{1}{6} = \frac{3 \times 6}{8 \times 1} = \frac{18}{8}
\]

Simplify.

So, $\frac{3}{8} + \frac{1}{6} = 2\frac{1}{4}$.

---

Add.

1. Rewrite with the LCD.

\[
\frac{1}{4} + \frac{3}{8} = \frac{1 \times 2}{4 \times 2} + \frac{3}{8} = \frac{2}{8} + \frac{3}{8} = \frac{5}{8}
\]

Simplest form: \frac{5}{8}

---

Subtract.

2. Rewrite with the LCD.

\[
\frac{5}{12} - \frac{7}{9} = \frac{5 \times 3}{12 \times 3} - \frac{7 \times 4}{9 \times 4} = \frac{15}{36} - \frac{28}{36} = \frac{-13}{36}
\]

Simplest form: \frac{-13}{36}

---

Multiply.

3. Rewrite with the LCD.

\[
\frac{4}{5} \times \frac{2}{3} = \frac{4 \times 2}{5 \times 3} = \frac{8}{15}
\]

Simplest form: \frac{8}{15}

---

Divide.

4. Rewrite with the LCD.

\[
\frac{11}{15} - \frac{6}{10} = \frac{11 \times 2}{15 \times 2} - \frac{6 \times 3}{10 \times 3} = \frac{22}{30} - \frac{18}{30} = \frac{4}{30} = \frac{2}{15}
\]

Simplest form: \frac{2}{15}

---

Check

Add, subtract, multiply, or divide. Write the answer in simplest form.

9. $\frac{7}{18} + \frac{5}{6} = \frac{7}{18} + \frac{15}{18} = \frac{22}{18} = \frac{11}{9}$

10. $\frac{13}{16} - \frac{1}{2} = \frac{13}{16} - \frac{8}{16} = \frac{5}{16}$

11. $\frac{4}{7} \times \frac{3}{12} = \frac{12}{84} = \frac{1}{7}$

12. $\frac{6}{15} \div \frac{8}{9} = \frac{6 \times 9}{15 \times 8} = \frac{54}{120} = \frac{9}{20}$