CHAPTER 12
Fractions as Parts of a Group

Goal
Use fractions to describe parts of a group.

1. a) What fraction of the group are people? \( \frac{4}{8} \) or \( \frac{1}{2} \)

b) What fraction of the group are dogs? \( \frac{3}{8} \)

c) What does \( \frac{1}{8} \) tell about the group?

\[ \frac{4}{8} \] of the group that is an adult
\[ \frac{3}{8} \] of the group that is a cat

or \[ \frac{4}{8} \] of the group that is a girl

At-Home Help
\( \frac{4}{5} \) of the squares are white.

\[ \boxed{\begin{array}{cc}
\text{were white} && \text{were black}
\end{array}} \]

4 is the numerator. It tells how many parts are white.
5 is the denominator. It tells how many parts there are in all.

2. a) Draw shapes. \( \frac{1}{4} \) of the shapes should be triangles.

\[ \boxed{\begin{array}{cc}
\text{triangle} && \text{square}
\end{array}} \]

For example:

\[ \boxed{\begin{array}{cc}
\text{triangle} && \text{triangle} && \text{triangle} && \text{triangle}
\end{array}} \]

b) What fraction are not triangles? \( \frac{3}{4} \)

c) What fraction are shapes? \( \frac{4}{4} \)

3. A club has 10 students in it. \( \frac{3}{10} \) of the students are in grade 3.

a) Draw a model of the group using circles.

\[ \boxed{\begin{array}{cc}
\text{circle} && \text{circle} && \text{circle} && \text{circle} && \text{circle} && \text{circle} && \text{circle} && \text{circle} && \text{circle}
\end{array}} \]

For example:

\[ \boxed{\begin{array}{cc}
\text{circle} && \text{circle} && \text{circle} && \text{circle} && \text{circle} && \text{circle} && \text{circle} && \text{circle} && \text{circle}
\end{array}} \]

b) What fraction of the students are not in grade 3? \( \frac{7}{10} \)

4. \( \frac{2}{6} \) of a group of shapes are circles and \( \frac{2}{6} \) are red.

Draw a group of shapes to fit the description.

For example:

\[ \boxed{\begin{array}{cc}
\text{circle} && \text{circle} && \text{square} && \text{square} && \text{square}
\end{array}} \]

\[ \boxed{\begin{array}{cc}
\text{red} && \text{red} && \text{yellow} && \text{yellow} && \text{yellow}
\end{array}} \]
Fractions as Parts of a Whole

Use fractions to describe parts of a whole.

1. a) What fraction of the pizza is plain? \( \frac{2}{8} \)
   b) What fraction of the pizza has pepperoni? \( \frac{5}{8} \)
   c) What fraction of the pizza has mushrooms? \( \frac{1}{8} \)

2. a) Draw pepperoni on \( \frac{3}{10} \) of 1 of the pizzas.
   b) Draw green peppers on \( \frac{2}{5} \) of another pizza.
   c) Draw mushrooms on \( \frac{4}{8} \) of another pizza.
   d) What fraction of each pizza is not covered?
      left \( \frac{3}{5} \)      middle \( \frac{4}{8} \)      right \( \frac{7}{10} \)
   e) Which pizza is half covered? middle

3. a) Draw pepperoni on \( \frac{3}{4} \) of the left pizza.
   b) Draw mushrooms on \( \frac{1}{4} \) of the middle pizza.
   c) Draw green peppers on \( \frac{4}{4} \) of the right pizza.
CHAPTER 12

Communicate Using Drawings

**Goal**
Represent and explain fractions using drawings.

**Use the Communication Checklist.**

1. Write instructions to explain how to divide this cake into 8 equal pieces.
   Test your instructions.
   Improve them if necessary.

   For example, use a ruler and draw straight lines to join opposite vertices. Do this until they are all joined.
   There will be 4 lines. They cross in the middle of the octagon. There are now 8 equal pieces.

   ![Octagon divided into 8 equal pieces](image)

   **At-Home Help**

   **Communication Checklist**
   - Did you show all the steps?
   - Did you put the steps in order?
   - Did you show the right amount of detail?
   - Did you include drawings?

2. Write instructions to explain how to fold a piece of paper into 16 equal pieces.
   Test your instructions.
   Improve them if necessary.

   For example, fold the paper in half. Then fold that still folded paper in half. Then fold that still folded paper in half again. Finally, fold the folded paper in half a 4th time.
   Unfold and you have 16 equal pieces.

   ![Folded paper into 16 equal pieces](image)
CHAPTER 12

Fractions as Parts of a Measure

Goal
Use fractions to describe parts of a measure.

Choose the correct answer for Questions 1 to 4.

1. What fraction of this glass is full?
   A. $\frac{1}{3}$  C. $\frac{1}{2}$
   B. $\frac{2}{3}$  D. $\frac{4}{5}$

2. What fraction of this glass is full?
   E. $\frac{1}{4}$  G. $\frac{1}{2}$
   F. $\frac{1}{3}$  H. $\frac{3}{4}$

3. What fraction of this ribbon is grey?
   A. $\frac{1}{3}$  C. $\frac{2}{4}$
   B. $\frac{2}{3}$  D. $\frac{3}{4}$

4. What fraction of this ribbon is grey?
   E. $\frac{3}{7}$  G. $\frac{3}{10}$
   F. $\frac{7}{3}$  H. $\frac{10}{3}$

5. a) How many minutes will it take for $\frac{1}{2}$ an hour to pass? ______ 30 minutes ______
   b) How many minutes will it take for $\frac{3}{4}$ of an hour to pass? ______ 45 minutes ______

6. Draw a mark to show how high the water level would be for each.
   a) $\frac{1}{2}$ full  b) $\frac{2}{4}$ full  c) $\frac{1}{3}$ full
**Mixed Numbers**

**Goal** Model and describe mixed numbers.

1. Write a mixed number for each model.
   a) \[ \frac{1}{3} \]
   b) \[ \frac{3}{4} \]
   c) \[ \frac{3}{5} \]

2. Colour \( \frac{1}{4} \) of 1 set of shapes blue.
   Colour \( \frac{2}{3} \) of the other set of shapes red.
   For example:
   
   - \[ \text{red} \]
   - \[ \text{blue} \]

3. Trevor had 3 sandwiches. He ate \( \frac{3}{4} \) of 1 sandwich. He gave the rest to his brother.
   a) Draw a picture to model what Trevor gave to his brother.
      For example:
      
      - \[ \text{model} \]
   b) What mixed number tells what he gave to his brother? \( \frac{2}{4} \)

4. Which does not show \( \frac{3}{3} \)?
   A. \[ \text{figure} \]
   B. \[ \text{figure} \]
   C. \[ \text{figure} \]
   D. \[ \text{figure} \]
Test Yourself

Circle the correct answer.

1. What fraction of the shapes are squares?
   A. \( \frac{2}{3} \)  
   B. \( \frac{2}{5} \)  
   C. \( \frac{3}{2} \)  
   D. \( \frac{3}{5} \)

2. What fraction of the coins are nickels?
   E. 2  
   F. \( \frac{1}{2} \)  
   G. \( \frac{2}{3} \)  
   H. \( \frac{1}{10} \)

3. What fraction of the hexagon is spotted?
   A. \( \frac{1}{4} \)  
   B. \( \frac{2}{6} \)  
   C. \( \frac{2}{4} \)  
   D. \( \frac{4}{6} \)

4. What fraction of the grid is shaded?
   E. \( \frac{6}{10} \)  
   F. \( \frac{10}{6} \)  
   G. \( \frac{4}{10} \)  
   H. \( \frac{10}{4} \)

5. What fraction of the glass is full?
   A. \( \frac{1}{4} \)  
   B. \( \frac{1}{3} \)  
   C. \( \frac{1}{2} \)  
   D. \( \frac{2}{3} \)

6. Which shows \( 3\frac{1}{2} \)?
   E.  
   F.  
   G.  
   H.  

7. How many tiles are missing?
   A. 2  
   B. \( 2\frac{1}{2} \)  
   C. 3  
   D. \( 2\frac{1}{4} \)