These are equivalent statements:

- \( \frac{6}{9} \) of the circles are shaded.
- \( \frac{2}{3} \) of the circles are shaded.
- 6 is \( \frac{2}{3} \) of 9.

\[ 6 : 9 = 2 : 3 \]

1. Write four equivalent statements for the picture.

   a) \( \frac{4}{6} \) are shaded
   
   b) \( \frac{2}{3} \) are shaded
   
   c) 4 is \( \frac{2}{3} \) of 6
   
   d) 4 : 6 = 2 : 3

2. Write a pair of equivalent ratios for the picture.

   a) 4 is \( \frac{1}{2} \) of 8
   
   b) 6 is \( \frac{3}{4} \) of 8
   
   c) 2 is \( \frac{1}{5} \) of 10

   \[ \frac{4}{8} = \frac{1}{2} \]

3. For the statement, write a pair of equivalent ratios and equivalent fractions.

   a) 14 is \( \frac{2}{3} \) of 21

   b) 12 is \( \frac{3}{4} \) of 16
4. Write a question mark where you are missing a piece of information.

a) 12 is \( \frac{4}{5} \) of what number?  
\[ \frac{12}{\text{part}} : \frac{?}{\text{whole}} = \frac{4}{5} : \frac{5}{\text{whole}} \] 
\[ \frac{12}{\text{part}} = \frac{4}{5} \]

b) 6 is how many quarters of 8?  
\[ \frac{6}{\text{part}} : \frac{8}{\text{whole}} = \frac{?}{\text{whole}} : \frac{4}{\text{part}} \] 
\[ \frac{6}{8} = \frac{?}{4} \]

c) What is \( \frac{2}{3} \) of 12?  
\[ \frac{\text{part}}{\text{whole}} : \frac{\text{whole}}{\text{part}} = \frac{\text{whole}}{\text{part}} : \frac{\text{part}}{\text{whole}} \]

5. Write a pair of equivalent ratios and a pair of equivalent fractions.

a) 15 is what percent of 20?  
\[ \frac{15}{\text{part}} : \frac{20}{\text{whole}} = \frac{?}{\text{whole}} : \frac{100}{\text{part}} \] 
\[ \frac{15}{20} = \frac{?}{100} \]

b) What is 20% of 50?  
\[ \frac{\text{part}}{\text{whole}} = \frac{\text{whole}}{\text{part}} \]

6. Write the two pieces of information you are given and what you need to find (?). Then write an equation for the problem.

a) What percent of 30 is 5?  
\[ \text{part} \frac{5}{\text{whole}} \text{whole} \frac{30}{\text{part}} \text{percent} \frac{?}{\text{whole}} \] 
\[ \frac{5}{30} = \frac{?}{100} \]

b) If 11 is 50%, what is 100%?  
\[ \text{part} \frac{\text{?}}{\text{whole}} \text{whole} \frac{\text{?}}{\text{part}} \text{percent} \frac{?}{\text{whole}} = \frac{?}{100} \]

c) What is 6% of 24?  
\[ \text{part} \frac{?}{\text{whole}} \text{whole} \frac{\text{percent}}{\text{?}} \] 
\[ \frac{?}{100} \]

d) If 4 is 16%, what is 100%?  
\[ \text{part} \frac{\text{?}}{\text{whole}} \text{whole} \frac{\text{percent}}{\text{?}} = \frac{?}{100} \]

e) What percent of 90 is 4?  
\[ \text{part} \frac{\text{?}}{\text{whole}} \text{whole} \frac{\text{percent}}{\text{?}} = \frac{?}{100} \]

f) What is 52% of 18?  
\[ \text{part} \frac{\text{?}}{\text{whole}} \text{whole} \frac{\text{percent}}{\text{?}} = \frac{?}{100} \]

g) 7 is what percent of 25?  
\[ \text{part} \frac{\text{?}}{\text{whole}} \text{whole} \frac{\text{percent}}{\text{?}} = \frac{?}{100} \]
If 5 subway tickets cost $4, how much do 20 tickets cost? Write the ratio of dollars to tickets as a fraction, then find an equivalent fraction by multiplying:

Step 1: \[
\frac{\text{Dollars}}{\text{Tickets}} = \frac{4}{5} = \frac{?}{20}
\]

Step 2: 
\[
\frac{4}{5} \times \frac{4}{4} = \frac{16}{20}
\]

Step 3: 
\[
\frac{4}{5} \times \frac{4}{4} = \frac{16}{20}, \text{ so 20 tickets cost $16.}
\]

7. Solve the proportion. Draw arrows and show what number you multiply by.
   a) \[\frac{3}{4} \times 5 = \frac{?}{20}\]
   b) \[\frac{1}{5} = \frac{?}{15}\]
   c) \[\frac{3}{5} = \frac{?}{35}\]
   d) \[\frac{4}{5} = \frac{?}{49}\]
   e) \[\frac{3}{8} = \frac{?}{24}\]
   f) \[\frac{2}{3} = \frac{?}{18}\]
   g) \[\frac{13}{20} = \frac{?}{100}\]
   h) \[\frac{5}{9} = \frac{?}{72}\]

8. Solve the proportion the way you did in Question 7. Hint: The arrow will point from right to left.
   a) \[\frac{15}{4} = \frac{3}{4}\]
   b) \[\frac{12}{5} = \frac{2}{5}\]
   c) \[\frac{15}{7} = \frac{3}{7}\]
   d) \[\frac{12}{18} = \frac{2}{3}\]

9. Complete the equivalent fraction. Start by reducing the given fraction. The first one has been started for you.
   a) \[\frac{8}{10} = \frac{4}{5} = \frac{?}{15}\]
   b) \[\frac{4}{6} = \frac{?}{15}\]
   c) \[\frac{40}{100} = \frac{?}{45}\]
   d) \[\frac{15}{18} = \frac{?}{30}\]
   e) \[\frac{70}{100} = \frac{?}{90}\]
   f) \[\frac{50}{75} = \frac{?}{36}\]

10. Tanya is paid $25 for 3 hours of work. How much would she be paid for 6 hours of work?

11. Three centimeters on a map represent 10 km in real life. If a lake is 9 cm long on the map, what is its actual length?

12. A goalie stopped 13 out of every 14 shots. There were 42 shots. How many goals were scored?
1. Write a proportion to represent the percent problem. Solve the proportion.
   a) What percent of 20 is 4? \[ \text{part} \quad \text{whole} \quad \text{percent} \quad \frac{\text{part}}{\text{whole}} = \frac{4}{20} = \frac{1}{5} \]
   b) If 6 is 25%, what is 100%? \[ \text{part} \quad \text{whole} \quad \text{percent} \quad \frac{\text{part}}{\text{whole}} = \frac{6}{25} = \frac{24}{100} \]
   c) What is 17% of 10? \[ \text{part} \quad \text{whole} \quad \text{percent} \quad \frac{\text{part}}{\text{whole}} = \frac{1.7}{10} = \frac{17}{100} \]
   d) What is 17% of 50? \[ \text{part} \quad \text{whole} \quad \text{percent} \quad \frac{\text{part}}{\text{whole}} = \frac{8.5}{50} = \frac{17}{100} \]
   e) 4 is what percent of 5? \[ \text{part} \quad \text{whole} \quad \text{percent} \quad \frac{\text{part}}{\text{whole}} = \frac{4}{5} = 80\% \]
   f) 6 is 25% of what number? \[ \text{part} \quad \text{whole} \quad \text{percent} \quad \frac{\text{part}}{\text{whole}} = \frac{6}{25} = \frac{24}{100} \]
   g) 24 is 80% of what number? \[ \text{part} \quad \text{whole} \quad \text{percent} \quad \frac{\text{part}}{\text{whole}} = \frac{24}{80} = \frac{3}{10} \]

2. Explain why the proportion \( \frac{3}{25} = \frac{x}{100} \) will be easy to solve.

3. Write a proportion \( \frac{a}{b} = \frac{\frac{x}{100}}{ \frac{a}{b} } \) to represent the problem. Solve by first writing \( \frac{a}{b} \) in lowest terms.
   a) What percent of 15 is 3? \[ \text{part} \quad \text{whole} \quad \text{percent} \quad \frac{\text{part}}{\text{whole}} = \frac{3}{15} = \frac{1}{5} \]
   b) What percent of 24 is 6? \[ \text{part} \quad \text{whole} \quad \text{percent} \quad \frac{\text{part}}{\text{whole}} = \frac{6}{24} = \frac{1}{4} \]
   c) What percent of 30 is 12? \[ \text{part} \quad \text{whole} \quad \text{percent} \quad \frac{\text{part}}{\text{whole}} = \frac{12}{30} = \frac{2}{5} \]

4. Write a proportion to represent the percent problem. Find an equivalent ratio to rewrite the proportion. Solve the new proportion.
   a) If 6 is 40%, what is 100%?
      \[ \text{part} \quad \text{whole} \quad \text{percent} \quad \frac{\text{part}}{\text{whole}} = \frac{\frac{6}{40}}{\frac{100}{40}} = \frac{6}{100} \]
      Hint: Start by writing 40% as an equivalent ratio with numerator 2. \( \frac{40}{100} = \frac{2}{5} \)
   b) What is 75% of 48? Hint: Start by writing 75% as an equivalent ratio with denominator 4.
      \[ \text{part} \quad \text{whole} \quad \text{percent} \quad \frac{\text{part}}{\text{whole}} = \frac{\frac{36}{4}}{\frac{75}{4}} = \frac{36}{75} \frac{4}{4} = \frac{36}{75} \]
   c) What percent of 60 is 45?
      \[ \text{part} \quad \text{whole} \quad \text{percent} \quad \frac{\text{part}}{\text{whole}} = \frac{\frac{45}{60}}{\frac{100}{60}} = \frac{45}{100} \]
   d) What is 60% of 15?
      \[ \text{part} \quad \text{whole} \quad \text{percent} \quad \frac{\text{part}}{\text{whole}} = \frac{\frac{9}{15}}{\frac{60}{15}} = \frac{9}{60} \frac{15}{15} = \frac{9}{60} \]

5. Solve.
   a) 9 is 60% of what number? \[ \text{part} \quad \text{whole} \quad \text{percent} \quad \frac{\text{part}}{\text{whole}} = \frac{9}{\frac{60}{100}} = \frac{9}{0.6} = 15 \]
   b) What is 75% of 24? \[ \text{part} \quad \text{whole} \quad \text{percent} \quad \frac{\text{part}}{\text{whole}} = \frac{\frac{18}{24}}{\frac{75}{24}} = \frac{18}{75} \frac{24}{24} = \frac{18}{75} \]
   c) 16 is 80% of what number? \[ \text{part} \quad \text{whole} \quad \text{percent} \quad \frac{\text{part}}{\text{whole}} = \frac{\frac{16}{80}}{\frac{100}{80}} = \frac{16}{80} \]
   d) What percent of 360 is 72? \[ \text{part} \quad \text{whole} \quad \text{percent} \quad \frac{\text{part}}{\text{whole}} = \frac{\frac{72}{360}}{\frac{100}{360}} = \frac{72}{360} \frac{100}{100} = \frac{2}{5} \]
6. If 35% of 120 students use an MP3 player, how many students use an MP3 player?

7. Ten students in a class (40% of the class) bike to school. How many students are in the class?

REMINDER: \( \frac{2}{3} \) of a number is 100. What is the number?

\[
\frac{2}{3} = \frac{100}{\text{part}} \quad \text{whole} \quad \frac{2}{3} \times 50 \quad \frac{100}{\text{part}} \quad \frac{2}{3} = \frac{100}{150}
\]

The number is 150.

8. What is the number?

a) \( \frac{2}{5} \) of a number is 4
b) \( \frac{3}{7} \) of a number is 9
c) \( \frac{5}{11} \) of a number is 25

9. A box holds red and blue beads. Find the total number of beads in the box.

a) \( \frac{3}{4} \) of the beads are red. Six beads are red.

b) \( \frac{3}{5} \) of the beads are blue. Twelve beads are blue.

c) 60% of the beads are red. Fifteen beads are red.

d) The ratio of red beads to blue beads is 4 : 5. There are 20 red beads. Hint: What fraction of the beads are red?

10. Emma and Sun share a sum of money. Emma receives \( \frac{2}{5} \) of the money. Sun receives $24.

a) What fraction of the sum did Sun receive?  
b) How much money did Emma and Sun share?

11. At Franklin Middle School, \( \frac{3}{8} \) of the students take a bus to school, \( \frac{3}{5} \) walk, and the rest bike.

There are 20 students who bike to school. How many students are in the school?

12. In a fish tank, \( \frac{2}{3} \) of the fish are red, \( \frac{1}{4} \) are yellow, and the rest are green. There are 42 more red fish than green fish.

a) What fraction of the fish are green?  
b) What fraction of the total number of fish does 42 represent? Hint: 42 is the difference between the number of red and green fish.

c) How many fish are in the tank?

13. In Carl’s stamp collection, 70% of the stamps are American and the rest are international. Carl has 500 more American stamps than international stamps. How many stamps does he have?

14. On an LED sign, \( \frac{1}{5} \) of the lights are yellow and the rest are blue and red. There are twice as many blue lights as yellow lights, and there are 200 red lights on the sign.

How many LED lights of all colors are on the sign?
1. Each bag contains the same number of apples. Let \( x \) be the number of apples in one bag. Write an expression for the total number of apples.

a)  

b)  

c)  

2. Write the total number of apples two ways to make an equation.

a) There are 9 apples in total. b) There are 11 apples in total. c) There are 20 apples in total.

3. a) The scales are balanced. Write an equation to show this.

b) Remove the same number of apples from each side to keep the scales balanced. Leave the bag by itself on one side. Write the new equation.

c) How many apples are in the bag? ______

Finding the value of a variable in an equation is called **solving for** the variable.

To solve \( x + 4 = 10 \), subtract 4 from both sides of the equation so that one side has only \( x \).

\[
\begin{align*}
  x + 4 &= 10 \\
  -4 &\quad -4 \\
  \hline
  x &= 6
\end{align*}
\]

4. Subtract 5 from both sides of the equation.

a) \( x + 5 = 8 \)  

b) \( 5 + x = 9 \)  

c) \( 3 = 5 + x \)  

d) \( 0 = x + 5 \)

\[
\begin{align*}
  -5 &\quad -5 \\
  \phantom{-5} &\quad \phantom{-5} \\
  \hline
  x &= 3
\end{align*}
\]

5. Subtract the same number from both sides of the equation so that \( x \) is by itself.

a) \( x + 2 = 8 \)  

b) \( 7 + x = 12 \)  

c) \( 11 = 6 + x \)  

d) \( 9 = 4 + x \)

\[
\begin{align*}
  -2 &\quad -2 \\
  -7 &\quad -7 \\
  \phantom{-6} &\quad \phantom{-6} \\
  -4 &\quad -4
\end{align*}
\]
6. Solve the equation by subtracting the same number from both sides.
   a) \( x + 11 = 20 \)  
   b) \( 9 + x = 15 \)  
   c) \( 65 = x + 28 \)  
   d) \( 43 = x + 15 \)

7. a) The scales are balanced. Write an equation to show this.

   ![Scales](image1)

   b) Divide the quantities on both sides into the same number of equal groups. Leave one group on each side. Write an equation.

   ![Scales](image2)

   c) How many apples are in each bag? _________

8. Divide both sides of the equation by the same number so that \( x \) is by itself.
   a) \( 3x = 12 \)  
   \( \div 3 \div 3 \)
   b) \( 8x = 32 \)  
   \( \div 8 \div 8 \)
   c) \( 12 = 6x \)  
   \( \div 6 \div 6 \)
   d) \( 24 = 4x \)  
   \( \div 4 \div 4 \)

9. Solve the equation by dividing both sides of the equation by the same number.
   a) \( 5x = 30 \)
   \( 5x \div 5 = 30 \div 5 \)
   \( x = 6 \)
   b) \( 3x = 18 \)
   c) \( 9x = 54 \)
   d) \( 7x = 56 \)
   e) \( 3x = 12,000 \)
   f) \( 4x = 680 \)
   g) \( 8x = 128 \)
   h) \( 5x = 135 \)

10. Solve the equation by doing the same thing to both sides of the equation.
    a) \( x + 4 = 12 \)
    b) \( 4x = 12 \)
    c) \( 5 + x = 35 \)
    d) \( 5x = 35 \)
    e) \( 5 + x = 11 \)
    f) \( 39 = 13x \)
    g) \( x + 14 = 27 \)
    h) \( 3x = 42 \)
REMINDER: You can subtract a negative number by adding its opposite.
Example: \(7 - (-4) = 7 + 4 = 11\)
You can add a negative number by subtracting its opposite.
Example: \(7 + (-4) = 7 - 4 = 3\)

11. Solve the equation by subtracting the same number from both sides.

   a) \(x + (-4) = 9\)
   \[x = 9 - (-4)\]
   \[x = 9 + 4\]
   \[x = 13\]

   b) \(x + (-8) = 15\)
   \[x = 15 - (-8)\]
   \[x = 15 + 8\]
   \[x = 23\]

   c) \(x + 5 = 13\)
   \[x = 13 - 5\]
   \[x = 8\]

   d) \(x + 5 = -13\)
   \[x = -13 - 5\]
   \[x = -18\]

   e) \(x + 3 = -8\)
   \[x = -8 - 3\]
   \[x = -11\]

   f) \(x + (-3) = -8\)
   \[x = -8 - (-3)\]
   \[x = -8 + 3\]
   \[x = -5\]

   g) \(x + 3 = 8\)
   \[x = 8 - 3\]
   \[x = 5\]

   h) \(x + (-3) = 8\)
   \[x = 8 - (-3)\]
   \[x = 8 + 3\]
   \[x = 11\]

REMINDER: You can multiply and divide positive and negative numbers by multiplying their absolute values and using the rules for signs:

\[
(+) \times (+) = + \quad (+) \times (-) = - \quad (-) \times (+) = - \quad (-) \times (-) = + \\
(+) \div (+) = + \quad (+) \div (-) = - \quad (-) \div (+) = - \quad (-) \div (-) = +
\]

12. Solve the equation by dividing both sides of the equation by the same number.

   a) \(4x = -12\)
   \[x = -12 \div 4\]
   \[x = -3\]

   b) \(-4x = 12\)
   \[x = 12 \div (-4)\]
   \[x = -3\]

   c) \(x \times (-4) = 12\)
   \[x = 12 \div (-4)\]
   \[x = -3\]

   d) \(-4x = -12\)
   \[x = -12 \div (-4)\]
   \[x = 3\]

   e) \(-42 = x \times (-6)\)
   \[x = -42 \div (-6)\]
   \[x = 7\]

   f) \(-39 = -13x\)
   \[x = -39 \div (-13)\]
   \[x = 3\]

   g) \(5 = \frac{1}{2}x\)
   \[x = 5 \times 2\]
   \[x = 10\]

   h) \(-\frac{1}{3}x = 6\)
   \[x = 6 \times (-3)\]
   \[x = -18\]
3/4 = 0.75 means the same thing as 3 ÷ 4 = 0.75, so 3 = 0.75 × 4.

1. Change the equation to a division statement, then to a multiplication statement.
   a) \( \frac{10}{5} = 2 \)  \( \frac{10}{5} \div 2 \)
   b) \( \frac{28}{4} = 7 \)  \( \frac{28}{4} \div 7 \)
   c) \( \frac{33}{3} = 11 \)  \( \frac{33}{3} \div 11 \)
   d) \( \frac{21}{7} = 3 \)  \( \frac{21}{7} \div 3 \)

2. Change the equation to a multiplication statement.
   a) \( \frac{7}{2} = 3.5 \)  \( \frac{7}{2} \times 3.5 \)
   b) \( \frac{12}{10} = 1.2 \)  \( \frac{12}{10} \times 1.2 \)
   c) \( \frac{-24}{6} = -4 \)  \( \frac{-24}{6} \times -4 \)
   d) \( \frac{21}{x} = 3 \)  \( \frac{21}{x} \times 3 \)

You can turn equivalent fractions into equivalent products. Multiply both fractions by the product of their denominators.

Example: \( \frac{3}{4} = \frac{9}{12} \). Multiply both fractions by \( 4 \times 12 \), the product of their denominators.

\[ \frac{3}{4} \times 4 \times 12 = \frac{9}{12} \times 4 \times 12 \]
\[ 3 \times 12 = 9 \times 4 \]

Rewriting \( \frac{3}{4} = \frac{9}{12} \) as \( 3 \times 12 = 9 \times 4 \) is called cross-multiplying because the products are obtained by multiplying the numbers in an \( \times \) shape:

3. Check that cross-multiplying works for the equivalent fractions.
   a) \( \frac{2}{5} = \frac{6}{15} \)  \( 2 \times 15 = 6 \times 5 \)
   b) \( \frac{3}{4} = \frac{6}{8} \)  \( 3 \times 8 = 4 \times 6 \)
   c) \( \frac{1}{2} = \frac{5}{10} \)  \( 1 \times 10 = 2 \times 5 \)
   d) \( \frac{2}{3} = \frac{8}{12} \)  \( 2 \times 12 = 3 \times 8 \)
   e) \( \frac{2.5}{3} = \frac{5}{6} \)  \( 2.5 \times 6 = 5 \times 3 \)
   f) \( \frac{-2}{3} = \frac{-8}{12} \)  \( -2 \times 12 = -3 \times 8 \)
   g) \( \frac{3}{5} = \frac{-9}{15} \)  \( 3 \times 15 = -9 \times 5 \)
   h) \( \frac{4}{-1.5} = \frac{8}{-3} \)  \( 4 \times -3 = -1.5 \times 8 \)
4. Cross-multiply and write = (equal) or ≠ (not equal) in the box. Are the fractions equivalent?

a) \( \frac{3}{4} \) and \( \frac{10}{13} \)

\[
\begin{align*}
3 \times 13 & = 10 \times 4 \\
\text{Are } \frac{3}{4} \text{ and } \frac{10}{13} \text{ equivalent? } & = \\
\end{align*}
\]

b) \( \frac{2}{5} \) and \( \frac{10}{25} \)

\[
\begin{align*}
\text{Are } \frac{2}{5} \text{ and } \frac{10}{25} \text{ equivalent? } & = \\
\end{align*}
\]

c) \( \frac{9}{10} \) and \( \frac{81}{100} \)

\[
\begin{align*}
\text{Are } \frac{9}{10} \text{ and } \frac{81}{100} \text{ equivalent? } & = \\
\end{align*}
\]

d) \( \frac{5}{7} \) and \( \frac{28}{35} \)

\[
\begin{align*}
\text{Are } \frac{5}{7} \text{ and } \frac{28}{35} \text{ equivalent? } & = \\
\end{align*}
\]

e) \( \frac{3}{4} \) and \( \frac{15}{20} \)

f) \( \frac{5}{6} \) and \( \frac{35}{42} \)

g) \( \frac{91}{105} \) and \( \frac{104}{120} \)

h) \( \frac{14}{21} \) and \( \frac{30}{48} \)

You can cross-multiply if you have equivalent complex fractions, too.

Example: \( \frac{3}{4} \) and \( \frac{7}{5} \)

\[
\begin{align*}
\frac{3}{4} \times \frac{7}{5} & = \frac{3 \times 7}{4 \times 5} = \frac{21}{20} \\
\text{and } \frac{7}{5} \times \frac{3}{4} & = \frac{7 \times 3}{5 \times 4} = \frac{21}{20} \\
\text{so } \frac{3}{4} \text{ and } \frac{7}{5} & \text{ are equivalent.}
\end{align*}
\]

5. Are the complex fractions equivalent? Cross-multiply to check.

a) \( \frac{2}{5} \) and \( \frac{2}{3} \)

b) \( \frac{3}{4} \) and \( \frac{3}{4} \)

c) Bonus \( \frac{3}{4} \) and \( \frac{-3}{2} \)

d) Bonus \( \frac{3}{4} \) and \( \frac{9}{5} \)

6. a) Complete the equivalent fraction. Start by reducing the given fraction.

i) \( \frac{8}{10} = \frac{4}{5} = \frac{15}{15} \)

ii) \( \frac{4}{6} = \frac{2}{3} = \frac{15}{15} \)

iii) \( \frac{70}{100} = \frac{7}{10} = \frac{90}{90} \)

b) Use cross multiplication to solve the problems in part a).

c) How would you solve the problem: mentally (by reducing the fraction) or with cross multiplication? Find the missing number.

i) \( \frac{40}{100} = \frac{18}{90} \)

ii) \( \frac{19}{20} = \frac{7}{7} \)

iii) \( \frac{50}{75} = \frac{24}{24} \)
RP7-35  Using Equations to Solve Proportions

You can solve a proportion by cross-multiplying and solving an equation.
\[
\frac{6}{x} = \frac{9}{6} \quad \Rightarrow \quad \frac{6}{x} \times \frac{x}{1} = \frac{9}{6} \times \frac{x}{1} \quad \Rightarrow \quad 9x = 6 \times 6
\]

1. Cross-multiply to write an equation for \( x \). (Do not solve.)
   a) \( \frac{7}{x} = \frac{3}{5} \)
   b) \( \frac{x}{9} = \frac{2}{5} \)
   c) \( \frac{11}{x} = \frac{5}{2} \)
   d) \( \frac{4}{9} = \frac{x}{3} \)

   a) \( 7 \times 5 = 3x \)
   b) \( 5x = 2 \times 9 \)

2. Solve for \( x \).
   a) \( \frac{9}{6} = \frac{x}{3} \)
   b) \( \frac{4}{x} = \frac{2}{3} \)
   c) \( \frac{3}{4} = \frac{6}{x} \)
   d) \( \frac{100}{7} = \frac{9}{x} \)

   e) \( \frac{2}{x} = \frac{10}{4} \)
   f) \( \frac{-5}{x} = \frac{1}{6} \)

   Bonus \( \frac{10}{5} = \frac{-x}{9} \)

You can solve percent problems by writing a proportion and then cross-multiplying.

Example: What is 70% of 9?
\[
\frac{x}{9} = \frac{70}{100} \quad \Rightarrow \quad 100x = 70 \times 9
\]

100x = 630
\(
x = \frac{630}{100}
\)
\(
x = 6.3
\)

3. Solve by first writing a proportion.
   a) What is 90% of 6?
   b) 9 is 2% of what number?

   c) 3 is what percent of 15?

   Bonus \( \frac{5}{8} = \frac{x}{9} \)
Answer all problems in your notebook.

Write an equation for each problem and solve the equation.
Use a calculator when you need it.

4. a) What percent of 32 is 8?  
   b) What percent of 125 is 5?  
   c) What percent of 128 is 32?  
   d) What percent of 15 is 0.6?

5. Round the solution to the nearest one.
   a) 5 is about what percent of 24?  
   b) About what percent of 17 is 9?  
   c) 4 is about what percent of 9?  
   d) About what percent of 7,560 is 3,000?  
   e) 1.3 is about what percent of 27?

6. If Grace has read 54 of the 297 pages in her library book, about what percent of the book has she read so far?

7. Find the amount. Include units in your answers.
   a) 26% of 130 g  
   b) 11% of 407 m  
   c) 32% of 11 mL  
   d) 99% of 8 m²  
   e) 40% of 2,222 min

8. About 3% of 592 students are vegans. About how many students are vegans?

9. A basketball team won 60% of the 25 games it played this year.
   a) What percent of the games played did the team lose?  
   b) How many games did the team lose?

10. What is 100% if …
    a) 25% is 30?  
    b) 15% is 30?  
    c) 3% is 12?

11. About what is 100%? Round the solution to the nearest one.
    a) 10 is 7%  
    b) 74 is 32%  
    c) 2 is 9%

12. In a Grade 7 class, 6 of the students, or about 27%, were on the honor roll.
    How many students are in the class?

Bonus ▶ Ben bought a new computer at a 15% discount. He paid $1,020.
    a) What percent of the original price did he pay?
    b) What was the original price?
    c) How much money did Ben save by buying the computer at a discount?