

# Decomposing Fractions

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_ / 24

## Quick Review

To **decompose** a fraction means to break it into a sum of smaller fractions that all have the **same denominator**. Think of  $\frac{5}{8}$  as five separate eighths:  $\frac{5}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$ . You can also group them in bigger chunks, such as  $\frac{5}{8} = \frac{2}{8} + \frac{3}{8}$ . There is more than one correct way to break a fraction apart — the numerators just have to **add up** to the original numerator, and the denominator stays the same. This same idea helps you break apart **mixed numbers**, like  $1\frac{1}{4} = \frac{4}{4} + \frac{1}{4} = \frac{5}{4}$ .

◊ **Example:** Decompose  $\frac{7}{10}$  into a sum of two fractions with denominator 10.  
 ⇒ We need two numerators that add up to 7, since the original numerator is 7. One easy choice is 4 and 3, because  $4 + 3 = 7$ . Keep the denominator 10 on each piece. So  $\frac{7}{10} = \frac{4}{10} + \frac{3}{10}$ . Other answers like  $\frac{5}{10} + \frac{2}{10}$  would also be correct.

**Answer:**  $\frac{7}{10} = \frac{4}{10} + \frac{3}{10}$

## PRACTICE

Decompose each fraction or mixed number as shown. More than one answer may be correct.

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| 1. $\frac{3}{5} = \frac{1}{5} + \frac{?}{5}$ _____               | 11. Decompose $\frac{2}{6}$ into unit fractions _____  |
| 2. $\frac{4}{6} = \frac{2}{6} + \frac{?}{6}$ _____               | 12. $\frac{9}{12} = \frac{6}{12} + \frac{?}{12}$ _____ |
| 3. $\frac{5}{8} = \frac{3}{8} + \frac{?}{8}$ _____               | 13. $\frac{7}{8} = \frac{4}{8} + \frac{?}{8}$ _____    |
| 4. $\frac{7}{12} = \frac{4}{12} + \frac{?}{12}$ _____            | 14. $\frac{8}{10} = \frac{5}{10} + \frac{?}{10}$ _____ |
| 5. $\frac{2}{3} = \frac{1}{3} + \frac{?}{3}$ _____               | 15. Write $1\frac{1}{4}$ as a fraction _____           |
| 6. $\frac{6}{10} = \frac{1}{10} + \frac{?}{10}$ _____            | 16. Write $1\frac{2}{3}$ as a fraction _____           |
| 7. $\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{?}{4}$ _____ | 17. Write $2\frac{1}{2}$ as a fraction _____           |
| 8. $\frac{5}{6} = \frac{2}{6} + \frac{1}{6} + \frac{?}{6}$ _____ | 18. Write $1\frac{3}{8}$ as a fraction _____           |
| 9. Decompose $\frac{4}{5}$ into unit fractions _____             | 19. Write $\frac{7}{4}$ as a mixed number _____        |
| 10. Decompose $\frac{3}{8}$ into unit fractions _____            | 20. Write $\frac{9}{5}$ as a mixed number _____        |

## Word Problems

21. A chocolate bar is split into 8 equal squares. Maya wants to show that her  $\frac{5}{8}$  of the bar is the same as one piece of  $\frac{2}{8}$  plus another piece. What is the other piece? \_\_\_\_\_
22. Liam jogged  $1\frac{1}{2}$  miles. Write the total distance he jogged as a single fraction. \_\_\_\_\_
23. A pizza is cut into sixths. The Reyes family ate  $\frac{5}{6}$  of it over two meals. If they ate  $\frac{3}{6}$  at dinner, what fraction did they eat at lunch? \_\_\_\_\_
24. A ribbon is  $\frac{11}{4}$  yards long. Write this length as a mixed number so it is easier to picture. \_\_\_\_\_



## Answer Keys

<p>1. <math>\frac{2}{5}</math></p> <p>2. <math>\frac{2}{6}</math></p> <p>3. <math>\frac{2}{8}</math></p> <p>4. <math>\frac{3}{12}</math></p> <p>5. <math>\frac{1}{3}</math></p> <p>6. <math>\frac{5}{10}</math></p> <p>7. <math>\frac{1}{4}</math></p> <p>8. <math>\frac{2}{6}</math></p> <p>9. <math>\frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}</math></p> <p>10. <math>\frac{1}{8} + \frac{1}{8} + \frac{1}{8}</math></p> <p>11. <math>\frac{1}{6} + \frac{1}{6}</math></p> <p>12. <math>\frac{3}{12}</math></p>	<p>13. <math>\frac{3}{8}</math></p> <p>14. <math>\frac{3}{10}</math></p> <p>15. <math>\frac{5}{4}</math></p> <p>16. <math>\frac{5}{3}</math></p> <p>17. <math>\frac{5}{2}</math></p> <p>18. <math>\frac{11}{8}</math></p> <p>19. <math>1\frac{3}{4}</math></p> <p>20. <math>1\frac{4}{5}</math></p> <p>21. <math>\frac{3}{8}</math></p> <p>22. <math>\frac{3}{2}</math> miles</p> <p>23. <math>\frac{2}{6}</math> of the pizza</p> <p>24. <math>2\frac{3}{4}</math> yards</p>
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### Step-by-Step Explanations

<p>1. The tops must add to 3. Since <math>1 + 2 = 3</math>, the missing part is <math>\frac{2}{5}</math>.</p> <p>2. The tops must add to 4. Since <math>2 + 2 = 4</math>, the missing part is <math>\frac{2}{6}</math>.</p> <p>3. The tops must add to 5. Since <math>3 + 2 = 5</math>, the missing part is <math>\frac{2}{8}</math>.</p> <p>4. The tops must add to 7. Since <math>4 + 3 = 7</math>, the missing part is <math>\frac{3}{12}</math>.</p> <p>5. The tops must add to 2. Since <math>1 + 1 = 2</math>, the missing part is <math>\frac{1}{3}</math>.</p> <p>6. The tops must add to 6. Since <math>1 + 5 = 6</math>, the missing part is <math>\frac{5}{10}</math>.</p> <p>7. The tops must add to 3. Since <math>1 + 1 + 1 = 3</math>, the missing part is <math>\frac{1}{4}</math>.</p> <p>8. The tops must add to 5. Since <math>2 + 1 + 2 = 5</math>, the missing part is <math>\frac{2}{6}</math>.</p> <p>9. A unit fraction has 1 on top. Four fifths is four copies of <math>\frac{1}{5}</math>.</p> <p>10. Three eighths is three copies of the unit fraction <math>\frac{1}{8}</math>.</p> <p>11. Two sixths is two copies of the unit fraction <math>\frac{1}{6}</math>.</p> <p>12. The tops must add to 9. Since <math>6 + 3 = 9</math>, the missing part is <math>\frac{3}{12}</math>.</p> <p>13. The tops must add to 7. Since <math>4 + 3 = 7</math>, the missing part is <math>\frac{3}{8}</math>.</p>	<p>14. The tops must add to 8. Since <math>5 + 3 = 8</math>, the missing part is <math>\frac{3}{10}</math>.</p> <p>15. One whole is <math>\frac{4}{4}</math>. Add the extra fourth: <math>\frac{4}{4} + \frac{1}{4} = \frac{5}{4}</math>.</p> <p>16. One whole is <math>\frac{3}{3}</math>. Add the extra two thirds: <math>\frac{3}{3} + \frac{2}{3} = \frac{5}{3}</math>.</p> <p>17. Two wholes are <math>\frac{4}{2}</math>. Add the extra half: <math>\frac{4}{2} + \frac{1}{2} = \frac{5}{2}</math>.</p> <p>18. One whole is <math>\frac{8}{8}</math>. Add three eighths: <math>\frac{8}{8} + \frac{3}{8} = \frac{11}{8}</math>.</p> <p>19. <math>\frac{4}{4}</math> makes one whole, leaving <math>\frac{3}{4}</math>. So <math>\frac{7}{4} = 1\frac{3}{4}</math>.</p> <p>20. <math>\frac{5}{5}</math> makes one whole, leaving <math>\frac{4}{5}</math>. So <math>\frac{9}{5} = 1\frac{4}{5}</math>.</p> <p>21. The two numerators must add to 5. Since <math>2 + 3 = 5</math>, the other piece is <math>\frac{3}{8}</math> of the bar.</p> <p>22. One whole mile is <math>\frac{2}{2}</math>. Add the extra half: <math>\frac{2}{2} + \frac{1}{2} = \frac{3}{2}</math> miles.</p> <p>23. The two parts must add to <math>\frac{5}{6}</math>. Since <math>3 + 2 = 5</math>, they ate <math>\frac{2}{6}</math> at lunch.</p> <p>24. Every <math>\frac{4}{4}</math> makes one whole yard. <math>\frac{8}{4}</math> is 2 yards, leaving <math>\frac{3}{4}</math>, so the ribbon is <math>2\frac{3}{4}</math> yards.</p>
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