

Operations with Rational Numbers

Recall:

- Integers are negative and positive counting numbers (-3, -2, -1, 0, 1, 2...)
- Rational numbers are those that can be expressed as a fraction of two integers

Exercises

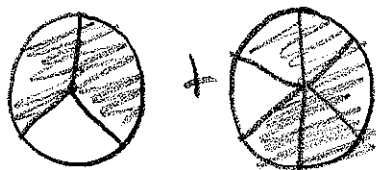
Write the given fractions each in simplest form:

1. $\frac{5 \div 5}{40 \div 5} = \frac{1}{8}$	2. $\frac{44 \div 11}{55 \div 11} = \frac{4}{5}$	3. $\frac{30 \div 15}{45 \div 15} = \frac{2}{3}$	4. $\frac{24 \div 2}{78 \div 2} = \frac{12}{39}$
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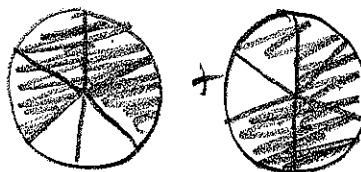
Illustrate each mixed fraction with pie charts, then convert to improper fraction form (where the numerator is greater than the denominator).

<p>5. $3\frac{1}{4}$</p> <p>$\frac{13}{4}$</p>	<p>6. $2\frac{3}{5}$</p> <p>$\frac{13}{5}$</p>	<p>7. $1\frac{5}{8}$</p> <p>$\frac{13}{8}$</p>
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8. Use pie charts to illustrate the expression $\frac{2}{3} + \frac{5}{6}$.



9. In order to add the pies together, the pieces must be the same size. Illustrate the best way to re-divide the pies, so that they can be added together.



What is the total of the two pies? $\frac{9}{6} = \frac{3}{2}$

10. Use your knowledge from #9 to show all steps in adding $\frac{2}{3} + \frac{5}{6}$

$$\frac{2 \cdot 2}{2 \cdot 3} + \frac{5}{6} = \frac{4}{6} + \frac{5}{6} = \frac{9}{6} = \frac{3}{2}$$

Adding and Subtracting Fractions Main Ideas:

- Must make common denominators
- Add or subtract numerators only

Add or subtract and simplify:

<p>5. $\frac{3}{8} - \frac{7}{8}$</p> $\frac{-4}{8} = -\frac{1}{2}$	<p>6. $\frac{3}{10} + \frac{3}{5} \cdot 2$</p> $\frac{3}{10} + \frac{6}{10}$ $\frac{9}{10}$	<p>7. $\frac{10}{10} \cdot 2 + \frac{3}{10} \cdot 3$</p> $\frac{20}{30} + \frac{9}{30} = \frac{29}{30}$	<p>8. $\frac{4}{4} \cdot 2 - \frac{1}{4} \cdot 3$</p> $\frac{8}{12} - \frac{3}{12}$ $\frac{5}{12}$
<p>9. $\frac{5}{5} \cdot 3 - \frac{1}{5} \cdot 4$</p> $\frac{15}{20} - \frac{4}{20} = \frac{11}{20}$	<p>10. $\frac{4}{4} \cdot 7 - \frac{1}{16} \cdot 3$</p> $\frac{28}{48} - \frac{3}{48}$ $\frac{25}{48}$	<p>11. $2 - \frac{5}{6}$</p> $\frac{6}{6} - \frac{5}{6}$ $\frac{12}{6} - \frac{5}{6} = \frac{7}{6}$	<p>12. $2\frac{1}{2} + 2\frac{3}{8}$</p> $\frac{4}{4} \cdot 5 + \frac{19}{8}$ $\frac{20}{8} + \frac{19}{8} = \frac{39}{8}$

Multiplying and Dividing Fractions Main Ideas:

- Multiply across the numerators
- Multiply across the denominators

• to divide, multiply by the reciprocal

Multiply or divide each and simplify:

<p>13. $\frac{1}{4} \cdot \frac{3}{12} = \frac{1}{16}$</p>	<p>14. $5\frac{1}{2} \times \frac{8}{16}$</p> $\frac{11}{2} \times \frac{8}{16} = \frac{44}{16} = \frac{11}{4}$	<p>15. $\frac{1}{12} \div \frac{3}{4}$</p> $\frac{1}{12} \times \frac{4}{3} = \frac{1}{9}$
<p>16. $\frac{2}{15} \div \frac{5}{9}$</p> $\frac{2}{15} \times \frac{9}{5} = \frac{6}{25}$	<p>17. $\frac{2}{5} \div \frac{20}{1}$</p> $\frac{2}{5} \times \frac{1}{20} = \frac{1}{50}$	<p>18. $24 \cdot \frac{3}{8}$</p> $\frac{24}{8} \cdot \frac{3}{1} = \frac{9}{1} = 9$