Fractions
Take Home Problems

The Division of Water Quality makes no claim as the accuracy of any answers provided herein.
3 Fractions

SKILLS CHECK

Complete and score the following skills test. Each section should be scored separately in the box provided to the right. A score of 8 or above indicates you are sufficiently strong in that concept. A score of 7 or below indicates a review of that section is advisable.

3.1 Naming Fractions

☐ Write the denominator that corresponds to each of the following figures (write answer in circle).

1. __________ 2. __________ 3. __________

☐ Which figure best represents the fraction given?

4. \[\frac{1}{2}\]:
   (a) \(\text{____}____\)  (b) \(\text{____}____\)  (c) \(\text{____}____\)  (d) \(\text{____}____\)  ANS____

5. \[\frac{1}{8}\]:
   (a) \(\text{____}____\)  (b) \(\text{____}____\)  (c) \(\text{____}____\)  (d) \(\text{____}____\)  ANS____

☐ In the following problems, write the fraction that represents the bold or shaded area.

6. \(\text{___}____\)  ANS____

7. \(\text{____}____\)  ANS____

8. \(\text{___}____\)  ANS____

9. \(\text{____}____\)  ANS____

10. \(\text{___}____\)  ANS____
3.2 Equivalent Fractions

- Write two equivalent fractions that represent the shaded area in the figure below.

1. [Shaded fraction diagram]

   - ANS: __________

- Give an equivalent fraction (using multiplication) for each fraction listed below.

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

3. \( \frac{1}{7} = \)

4. \( \frac{9}{11} = \)

- Give an equivalent fraction (using division) for each fraction listed below.

5. \( \frac{10}{18} = \)

6. \( \frac{6}{36} = \)

7. \( \frac{16}{56} = \)

- Are the pairs of fractions shown below equivalent fractions? If yes, what is the cross multiplication product?

8. \( \frac{2}{3} = \frac{96}{144} \) ANS: ________

   Cross Product: ________

9. \( \frac{3}{14} = \frac{33}{152} \) ANS: ________

   Cross Product: ________

10. \( \frac{4}{7} = \frac{380}{665} \) ANS: ________

   Cross Product: ________

3.3 Reducing Fractions

- Reduce each fraction to lowest terms.

1. \( \frac{6}{8} = \) __________

2. \( \frac{16}{20} = \) __________

3. \( \frac{9}{12} = \) __________

4. \( \frac{15}{25} = \) __________

5. \( \frac{20}{24} = \) __________

6. \( \frac{7}{19} = \) __________

7. \( \frac{72}{81} = \) __________

8. \( \frac{132}{352} = \) __________

9. \( \frac{16}{52} = \) __________

10. \( \frac{17}{30} = \) __________
### 3.4 Lowest Common Denominators

Find the lowest common denominator for each group of fractions and rewrite the fractions using the LCD.

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<tbody>
<tr>
<td>1.</td>
<td>$\frac{2}{3}$, $\frac{4}{5}$</td>
<td>ANS</td>
<td></td>
<td>2.</td>
<td>$\frac{5}{8}$, $\frac{7}{12}$</td>
<td>ANS</td>
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<td>3.</td>
<td>$\frac{1}{6}$, $\frac{3}{4}$</td>
<td>ANS</td>
<td></td>
<td>4.</td>
<td>$\frac{1}{8}$, $\frac{16}{20}$</td>
<td>ANS</td>
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<tr>
<td>5.</td>
<td>$\frac{2}{9}$, $\frac{1}{12}$</td>
<td>ANS</td>
<td></td>
<td>6.</td>
<td>$\frac{1}{10}$, $\frac{43}{80}$</td>
<td>ANS</td>
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<tr>
<td>7.</td>
<td>$\frac{1}{4}$, $\frac{3}{5}$, $\frac{1}{2}$</td>
<td>ANS</td>
<td></td>
<td>8.</td>
<td>$\frac{2}{3}$, $\frac{3}{4}$, $\frac{1}{6}$</td>
<td>ANS</td>
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<tr>
<td>9.</td>
<td>$\frac{7}{10}$, $\frac{1}{2}$, $\frac{3}{4}$</td>
<td>ANS</td>
<td></td>
<td>10.</td>
<td>$\frac{2}{3}$, $\frac{7}{8}$, $\frac{5}{6}$</td>
<td>ANS</td>
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### 3.5 Improper Fractions and Mixed Numbers

Write a mixed number for the part that is shaded. Reduce fractions to lowest terms.

1. ![Shaded Part](image1.png) = 

2. ![Shaded Part](image2.png) = 

Write each mixed number as an improper fraction.

3. $6\frac{7}{8}$ = 
4. $12\frac{2}{7}$ = 
5. $5\frac{3}{5}$ = 
6. $26\frac{2}{3}$ = 

Write each improper fraction as a whole number or mixed number in lowest terms.

7. $\frac{14}{5}$ = 
8. $\frac{27}{8}$ = 
9. $\frac{48}{7}$ = 
10. $\frac{18}{10}$ =
### 3.6 Addition or Subtraction of Fractions or Mixed Numbers

Add or subtract, as indicated. Reduce answers to lowest terms.

1. \( \frac{5}{8} + \frac{3}{10} = \)  
2. \( \frac{5}{8} - \frac{3}{4} = \)
3. \( \frac{3}{4} + \frac{4}{7} = \)
4. \( \frac{7}{5} \times \frac{12}{5} + \frac{3}{5} = \)
5. \( \frac{3}{4} - \frac{1}{9} = \)
6. \( \frac{1}{5} - \frac{1}{8} = \)
7. \( \frac{5}{6} + \frac{1}{12} = \)
8. \( 10\frac{1}{3} - 5\frac{3}{5} = \)

9. If a treatment plant receives \( \frac{1}{5} \) of the daily flow from District 1 and \( \frac{2}{7} \) of the daily flow from District 2, what fraction of the daily flow is contributed by these two districts?

ANS ______

10. Four sewer mains feed into a treatment plant. If three of the mains contribute relative flows of \( \frac{1}{3} \), \( \frac{1}{6} \), and \( \frac{1}{24} \), what is the fractional flow contributed by the fourth main?

ANS ______

### 3.7 Multiplication of Fractions or Mixed Numbers

Multiply as indicated, using cancellation of common factors when possible. Reduce answers to lowest terms.

1. \( \frac{3}{8} \times \frac{1}{7} = \)
2. \( \frac{5}{6} \times \frac{7}{9} = \)
3. \( \frac{9}{10} \times 1\frac{1}{4} = \)
4. \( 8\frac{1}{2} \times \frac{2}{3} = \)
5. \( \frac{1}{5} \times 2 = \)
6. \( 13\frac{1}{9} \times \frac{3}{26} = \)
7. \( \frac{1}{9} \times 7\frac{5}{10} = \)
8. \( 52 \times \frac{1}{3} = \)

Continued on next page...
3.7 Multiplication of Fractions or Mixed Numbers—Continued

9. Water fills a tank to \( \frac{4}{5} \) of its capacity. If the capacity of the tank is 35,000 cu ft, how many cu ft of water are in the tank?

ANS ______

10. On a particular day, the flow to the treatment plant was 7 million gallons. If \( \frac{1}{20} \) of the flow was industrial waste, how many million gallons of flow were industrial waste?

ANS ______

3.8 Division by Fractions or Mixed Numbers

- Divide the fractions and mixed numbers given below. Reduce answers to lowest terms.

1. \( \frac{15}{16} + \frac{5}{8} = \) ______

2. \( \frac{3}{4} + \frac{7}{9} = \) ______

3. \( 4 + \frac{4}{12} = \) ______

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

5. \( 7\frac{2}{9} + 5\frac{1}{3} = \) ______

6. \( \frac{5}{6} + \frac{2}{9} = \) ______

7. \( 1\frac{11}{12} + \frac{5}{14} = \) ______

8. \( 10 + \frac{5}{6} = \) ______

9. \( 16\frac{2}{3} + \frac{3}{4} = \) ______

10. \( 250 + \frac{1}{4} = \) ______
3.9 Combined Calculations with Fractions

Complete the problems shown below. Reduce answers to lowest terms. (Each problem is worth 2 points.)

1. \(\frac{8}{3} \times 5 = \)  
2. \(\frac{3}{5} + \frac{6}{14} = \)

3. \(\frac{1}{2} \times \frac{3}{7} \times \frac{1}{8} \times 10 = \)  
4. \(\frac{1}{6} + \frac{2}{3} + \frac{4}{6} = \)

5. \(\frac{1}{3} \times \frac{2}{4} = \)  
6. \(\frac{5}{9} \div 6 = \)