Evaluate square roots and cube roots. Simplify each expression.

**Form A**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$\sqrt{16} = 4$</td>
</tr>
<tr>
<td>2</td>
<td>$\sqrt{0} = 0$</td>
</tr>
<tr>
<td>3</td>
<td>$\sqrt{1} = 1$</td>
</tr>
<tr>
<td>4</td>
<td>$\sqrt{64} = 8$</td>
</tr>
<tr>
<td>5</td>
<td>$\sqrt{144} = 12$</td>
</tr>
<tr>
<td>6</td>
<td>$\sqrt{169} = 13$</td>
</tr>
<tr>
<td>7</td>
<td>$\sqrt{8} = 2$</td>
</tr>
<tr>
<td>8</td>
<td>$\sqrt{100} = 10$</td>
</tr>
<tr>
<td>9</td>
<td>$\sqrt{49} = 7$</td>
</tr>
<tr>
<td>10</td>
<td>$\sqrt{27} = 3$</td>
</tr>
<tr>
<td>11</td>
<td>$\sqrt{125} = 5$</td>
</tr>
<tr>
<td>12</td>
<td>$\sqrt{2,500} = 50$</td>
</tr>
<tr>
<td>13</td>
<td>$\sqrt{64} = 4$</td>
</tr>
<tr>
<td>14</td>
<td>$\sqrt{900} = 30$</td>
</tr>
<tr>
<td>15</td>
<td>$\sqrt{36} = 6$</td>
</tr>
<tr>
<td>16</td>
<td>$\sqrt{441} = 21$</td>
</tr>
<tr>
<td>17</td>
<td>$\sqrt{1,000} = 10$</td>
</tr>
<tr>
<td>18</td>
<td>$\sqrt{25} = 5$</td>
</tr>
</tbody>
</table>

**Form B**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$\sqrt{9} = 3$</td>
</tr>
<tr>
<td>2</td>
<td>$\sqrt{1} = 1$</td>
</tr>
<tr>
<td>3</td>
<td>$\sqrt{0} = 0$</td>
</tr>
<tr>
<td>4</td>
<td>$\sqrt{81} = 9$</td>
</tr>
<tr>
<td>5</td>
<td>$\sqrt{121} = 11$</td>
</tr>
<tr>
<td>6</td>
<td>$\sqrt{1,000} = 10$</td>
</tr>
<tr>
<td>7</td>
<td>$\sqrt{27} = 3$</td>
</tr>
<tr>
<td>8</td>
<td>$\sqrt{25} = 5$</td>
</tr>
<tr>
<td>9</td>
<td>$\sqrt{4} = 2$</td>
</tr>
<tr>
<td>10</td>
<td>$\sqrt{225} = 15$</td>
</tr>
<tr>
<td>11</td>
<td>$\sqrt{400} = 20$</td>
</tr>
<tr>
<td>12</td>
<td>$\sqrt{216} = 6$</td>
</tr>
<tr>
<td>13</td>
<td>$\sqrt{64} = 8$</td>
</tr>
<tr>
<td>14</td>
<td>$\sqrt{1,600} = 40$</td>
</tr>
<tr>
<td>15</td>
<td>$\sqrt{625} = 25$</td>
</tr>
<tr>
<td>16</td>
<td>$\sqrt{8} = 2$</td>
</tr>
<tr>
<td>17</td>
<td>$\sqrt{512} = 8$</td>
</tr>
<tr>
<td>18</td>
<td>$\sqrt{961} = 31$</td>
</tr>
</tbody>
</table>
Rational and Irrational Numbers—Skills Practice

Solve equations of the form $x^2 = p$ and $x^3 = p$.

**Form A**

1. $x^2 = 1; x = \boxed{1, -1}$
2. $x^2 = 49; x = \boxed{7, -7}$
3. $x^2 = 81; x = \boxed{9}$
4. $x^2 = 100; x = \boxed{10, -10}$
5. $x^2 = \frac{4}{9}; x = \boxed{\frac{2}{3}, -\frac{2}{3}}$
6. $x^2 = 144; x = \boxed{12, -12}$
7. $x^2 = \frac{1}{4}; x = \boxed{\frac{1}{2}}$
8. $x^2 = \frac{81}{100}; x = \boxed{\frac{9}{10}, -\frac{9}{10}}$
9. $x^2 = 16; x = \boxed{4, -4}$
10. $x^2 = 64; x = \boxed{8}$
11. $x^2 = 900; x = \boxed{30, -30}$
12. $x^2 = \frac{1}{49}; x = \boxed{\frac{1}{7}, -\frac{1}{7}}$
13. $x^2 = 125; x = \boxed{5}$
14. $x^2 = \frac{36}{49}; x = \boxed{\frac{6}{7}, -\frac{6}{7}}$
15. $x^2 = \frac{2}{25}; x = \boxed{\frac{3}{5}, -\frac{3}{5}}$
16. $x^2 = 2,500; x = \boxed{50, -50}$
17. $x^2 = \frac{1}{27}; x = \boxed{\frac{1}{3}}$
18. $x^2 = 36; x = \boxed{6, -6}$

**Form B**

1. $x^2 = 121; x = \boxed{11, -11}$
2. $x^2 = 1,000; x = \boxed{10}$
3. $x^2 = \frac{25}{49}; x = \boxed{\frac{5}{7}, -\frac{5}{7}}$
4. $x^2 = 25; x = \boxed{5, -5}$
5. $x^2 = \frac{9}{64}; x = \boxed{\frac{3}{8}, -\frac{3}{8}}$
6. $x^2 = 1; x = \boxed{1}$
7. $x^2 = 9; x = \boxed{3, -3}$
8. $x^2 = \frac{27}{64}; x = \boxed{\frac{3}{4}}$
9. $x^2 = 0; x = \boxed{0}$
10. $x^2 = \frac{121}{144}; x = \boxed{\frac{11}{12}, -\frac{11}{12}}$
11. $x^2 = 1,600; x = \boxed{40, -40}$
12. $x^2 = \frac{44}{125}; x = \boxed{\frac{4}{5}}$
13. $x^2 = 441; x = \boxed{21, -21}$
14. $x^2 = \frac{81}{81}; x = \boxed{\frac{9}{9}}$
15. $x^2 = 225; x = \boxed{15, -15}$
16. $x^2 = 216; x = \boxed{6}$
17. $x^2 = 625; x = \boxed{25, -25}$
18. $x^2 = \frac{1}{9}; x = \boxed{\frac{1}{3}, -\frac{1}{3}}$
Rational and Irrational Numbers — Skills Practice

Form A

Name: ___________________________

Approximate irrational numbers.

Write the two consecutive whole numbers that the given number is between.

1. \( \sqrt{5} \) 2 and 3 
2. \( \sqrt{10} \) 3 and 4 
3. \( \sqrt{16} \) 2 and 3 
4. \( \sqrt{28} \) 5 and 6 
5. \( \sqrt{23} \) 4 and 5 
6. \( \sqrt{84} \) 9 and 10 
7. \( \sqrt{45} \) 6 and 7 
8. \( \sqrt{29} \) 5 and 6 
9. \( \sqrt{70} \) 8 and 9

Approximate to the nearest whole number.

10. \( \sqrt{5} \) 2 
11. \( \sqrt{10} \) 3 
12. \( \sqrt{16} \) 3 
13. \( \sqrt{28} \) 5 
14. \( \sqrt{23} \) 5 
15. \( \sqrt{84} \) 9 
16. \( \sqrt{45} \) 7

Approximate to the nearest tenth.

17. \( \sqrt{5} \) 2.2 
18. \( \sqrt{10} \) 3.2 
19. \( \sqrt{16} \) 3.2 
20. \( \sqrt{28} \) 5.3 
21. \( \sqrt{23} \) 4.8 
22. \( \sqrt{84} \) 9.2

Approximate to the nearest hundredth.

23. \( \sqrt{5} \) 2.24 
24. \( \sqrt{10} \) 3.16 
25. \( \sqrt{16} \) 3.16 
26. \( \sqrt{28} \) 5.30 
27. \( \sqrt{23} \) 4.80 
28. \( \sqrt{84} \) 9.20

Form B

Name: ___________________________

Approximate irrational numbers.

Write the two consecutive whole numbers that the given number is between.

1. \( \sqrt{2} \) 1 and 2 
2. \( \sqrt{3} \) 1 and 2 
3. \( \sqrt{7} \) 2 and 3 
4. \( \sqrt{14} \) 3 and 4 
5. \( \sqrt{55} \) 7 and 8 
6. \( \sqrt{39} \) 6 and 7 
7. \( \sqrt{99} \) 9 and 10 
8. \( \sqrt{39} \) 6 and 7 
9. \( \sqrt{39} \) 4 and 5

Approximate to the nearest whole number.

10. \( \sqrt{2} \) 1 
11. \( \sqrt{3} \) 2 
12. \( \sqrt{7} \) 2 
13. \( \sqrt{14} \) 3 
14. \( \sqrt{55} \) 7 
15. \( \sqrt{39} \) 6 
16. \( \sqrt{99} \) 10

Approximate to the nearest tenth.

17. \( \sqrt{2} \) 1.4 
18. \( \sqrt{3} \) 1.7 
19. \( \sqrt{7} \) 2.6 
20. \( \sqrt{14} \) 3.7 
21. \( \sqrt{55} \) 7.4 
22. \( \sqrt{39} \) 6.2

Approximate to the nearest hundredth.

23. \( \sqrt{2} \) 1.41 
24. \( \sqrt{3} \) 1.73 
25. \( \sqrt{7} \) 2.65 
26. \( \sqrt{14} \) 3.70 
27. \( \sqrt{55} \) 7.40 
28. \( \sqrt{39} \) 6.20
Rational and Irrational Numbers—Skills Practice

Form A

Approximate expressions with irrational numbers.

Give the two consecutive whole numbers that the given expression is between.

1. \(2\sqrt{3}\) __________ 3 and 4
2. \(2\pi\) __________ 6 and 7
3. \(\sqrt{35} + 2\) __________ 7 and 8
4. \(\frac{4}{3}\pi\) __________ 4 and 5
5. \(4\sqrt{5}\) __________ 8 and 9
6. \(\sqrt{48} - 2\) __________ 4 and 5

Approximate the value of the expression to the nearest whole number.

7. \(\sqrt{5} + \sqrt{2}\) __________ 4
8. \(\pi^2\) __________ 10
9. \(\frac{3\sqrt{3}}{2}\) __________ 2
10. \(3\pi\) __________ 9
11. \((\sqrt{2})^2\) __________ 3
12. \(3\sqrt{24}\) __________ 15

Approximate the value of the expression to the nearest tenth.

13. \(\sqrt{5} - \sqrt{2}\) __________ 0.3
14. \(\frac{\sqrt{7}}{2}\) __________ 0.7
15. \(\frac{1}{\sqrt{3}}\) __________ 0.6
16. \(\frac{3}{2}\) __________ 1.6
17. \(\frac{2}{\sqrt{2}}\) __________ 1.4
18. \(5 - \pi\) __________ 1.9

Form B

Approximate expressions with irrational numbers.

Give the two consecutive whole numbers that the given expression is between.

1. \(2\sqrt{3}\) __________ 2 and 3
2. \(4\pi\) __________ 12 and 13
3. \(\sqrt{35} - 2\) __________ 3 and 4
4. \(\frac{2}{3}\pi\) __________ 2 and 3
5. \(4\sqrt{8}\) __________ 11 and 12
6. \(\sqrt{48} + 2\) __________ 8 and 9

Approximate the value of the expression to the nearest whole number.

7. \(\sqrt{3} + \sqrt{2}\) __________ 3
8. \(\pi^2\) __________ 10
9. \(\frac{\sqrt{65}}{3}\) __________ 3
10. \(\frac{\pi}{3}\) __________ 1
11. \((\sqrt{5})^2\) __________ 5
12. \(4\sqrt{26}\) __________ 20

Approximate the value of the expression to the nearest tenth.

13. \(\sqrt{5} - \sqrt{3}\) __________ 0.5
14. \(\sqrt{\frac{3}{2}}\) __________ 0.9
15. \(\frac{1}{\sqrt{2}}\) __________ 0.7
16. \(5\pi\) __________ 15.7
17. \(\frac{2}{\sqrt{3}}\) __________ 1.2
18. \(6 - \pi\) __________ 2.9
Rational and Irrational Numbers—
Skills Practice

Rewrite a repeating decimal as a fraction.

Form A

Name: _______________________

1. \(0.6 = \frac{2}{3}\) or \(\frac{6}{10}\)
2. \(0.63 = \frac{7}{11}\) or \(\frac{63}{100}\)
3. \(0.4 = \frac{9}{25}\)
4. \(0.83 = \frac{5}{6}\) or \(\frac{83}{100}\)
5. \(0.13 = \frac{2}{15}\)
6. \(0.27 = \frac{5}{18}\) or \(\frac{27}{100}\)
7. \(0.61 = \frac{1}{16}\) or \(\frac{83}{50}\)
8. \(0.06 = \frac{1}{15}\)
9. \(0.94 = \frac{17}{18}\) or \(\frac{94}{100}\)
10. \(0.36 = \frac{4}{11}\) or \(\frac{36}{99}\)
11. \(0.7 = \frac{7}{9}\)
12. \(0.54 = \frac{6}{11}\) or \(\frac{54}{99}\)
13. \(0.416 = \frac{5}{12}\) or \(\frac{416}{900}\)
14. \(0.86 = \frac{13}{15}\) or \(\frac{86}{90}\)
15. \(0.083 = \frac{1}{12}\) or \(\frac{83}{900}\)
16. \(0.27 = \frac{11}{42}\) or \(\frac{27}{100}\)
17. \(0.7 = \frac{1}{9}\)
18. \(0.90 = \frac{10}{11}\) or \(\frac{90}{99}\)

Form B

1. \(0.3 = \frac{1}{3}\) or \(\frac{3}{9}\)
2. \(0.81 = \frac{9}{11}\) or \(\frac{81}{90}\)
3. \(0.5 = \frac{5}{9}\)
4. \(0.16 = \frac{1}{6}\) or \(\frac{16}{90}\)
5. \(0.73 = \frac{11}{15}\) or \(\frac{73}{90}\)
6. \(0.38 = \frac{7}{18}\) or \(\frac{38}{90}\)
7. \(0.72 = \frac{13}{18}\) or \(\frac{72}{90}\)
8. \(0.26 = \frac{4}{15}\) or \(\frac{26}{90}\)
9. \(0.53 = \frac{8}{15}\) or \(\frac{53}{90}\)
10. \(0.18 = \frac{2}{11}\) or \(\frac{18}{99}\)
11. \(0.2 = \frac{2}{9}\)
12. \(0.45 = \frac{5}{11}\) or \(\frac{45}{99}\)
13. \(0.583 = \frac{7}{12}\) or \(\frac{583}{900}\)
14. \(0.05 = \frac{1}{18}\)
15. \(0.916 = \frac{11}{12}\) or \(\frac{916}{900}\)
16. \(0.09 = \frac{1}{11}\) or \(\frac{9}{99}\)
17. \(0.8 = \frac{8}{9}\)
18. \(0.72 = \frac{8}{11}\) or \(\frac{72}{99}\)
Rational and Irrational Numbers—Repeated Reasoning

Find patterns in repeating decimals. Rewrite each decimal as a fraction.

Set A

1. \(0.3 = \frac{3}{9} \) or \(\frac{1}{3}\)
2. \(0.03 = \frac{3}{90} \) or \(\frac{1}{30}\)
3. \(0.003 = \frac{3}{900} \) or \(\frac{1}{300}\)
4. \(0.4 = \frac{4}{9}\)
5. \(0.04 = \frac{4}{90} \) or \(\frac{2}{45}\)
6. \(0.004 = \frac{4}{900} \) or \(\frac{2}{225}\)
7. \(0.5 = \frac{5}{9}\)
8. \(0.05 = \frac{5}{90} \) or \(\frac{1}{18}\)
9. \(0.005 = \frac{5}{900} \) or \(\frac{1}{180}\)

Set B

1. \(0.3 = \frac{3}{9} \) or \(\frac{1}{3}\)
2. \(0.03 = \frac{3}{99} \) or \(\frac{1}{33}\)
3. \(0.003 = \frac{3}{999} \) or \(\frac{1}{333}\)
4. \(0.4 = \frac{4}{9}\)
5. \(0.04 = \frac{4}{99}\)
6. \(0.004 = \frac{4}{999}\)
7. \(0.5 = \frac{5}{9}\)
8. \(0.05 = \frac{5}{99}\)
9. \(0.005 = \frac{5}{999}\)

Describe a pattern you see in one of the sets of problems above.

Answers will vary. Sample answer: In Set A, as the digit that repeats moves one decimal place to the right, the fraction is \(\frac{1}{10}\) of the fraction in the previous problem.

---

Integer Exponents—Skills Practice

Name: ________________________________

Simplify expressions with exponents.

Rewrite each expression using a single nonnegative exponent.

1. \(y^5 \cdot y^7 = y^{12}\)
2. \((m^3)^4 = m^{12}\)
3. \(n^6 \cdot n^5 = n^{11}\)
4. \(m^4 = \frac{1}{m^4}\)
5. \(y^4 = y^{17}\)
6. \(n^6 = \frac{n^6}{n^3}\)

Evaluate each expression.

7. \(4^2 \cdot 4^3 = 64\)
8. \(2^3 \cdot 5 = 1,000\)
9. \(2^5 = 4,096\)
10. \((5^n)^2 = 15,625\)
11. \(6^4 \cdot 7^2 = 1,764\)
12. \(n^3 = \frac{1}{9}\)
13. \(3^2 \cdot 3^3 = 243\)
14. \(5^n = 64\)
15. \(n^2 = 8\)
16. \(2^3 \cdot 3^2 = 1,296\)
17. \(5^n = 4\)
18. \(n^2 = 5\)
**Integer Exponents—Skills Practice**

**Form B**

**Simplify expressions with exponents.**

Rewrite each expression using a single nonnegative exponent.

1. \( y^4 \cdot y^7 = \) __________
2. \( m^9 \cdot m^7 = \) __________
3. \( n^6 \cdot n^{11} = \) __________
4. \( \frac{m^7}{m^3} = \) __________
5. \( (n^6)^5 = \) __________
6. \( \frac{m^6}{m^5} = \) __________

Evaluate each expression.

7. \( 5^2 \cdot 5^3 = \) __________
8. \( 2^4 \cdot 2^6 = \) __________
9. \( (2^3)^2 = \) __________
10. \( 3^2 \cdot 2^4 = \) __________
11. \( 10^3 \cdot 2^5 = \) __________
12. \( \left( \frac{2}{3} \right)^2 = \) __________

13. \( 2^2 \cdot 2^2 = \) __________
14. \( \frac{10^5}{2^2} = \) __________
15. \( \frac{2^7}{3^2} = \) __________
16. \( 4^2 \cdot 2^2 = \) __________
17. \( \frac{3^4}{2^3} = \) __________
18. \( \frac{3^6}{2^4} = \) __________

19. \( (3^4)^3 = \) __________
20. \( (2^7)^2 = \) __________
21. \( (\frac{2}{3})^3 = \) __________
22. \( (\frac{10}{3})^2 = \) __________

**Form A**

**Simplify more expressions with exponents.**

Rewrite each expression using a single exponent.

1. \( y^{-4} \cdot y^7 = \) __________
2. \( m^{-9} \cdot m^7 = \) __________
3. \( n^{-6} \cdot n^{11} = \) __________
4. \( \frac{m^{10}}{m^3} = \) __________
5. \( (n^6)^{-5} = \) __________
6. \( \frac{m^6}{m^5} = \) __________

Evaluate each expression.

7. \( 2^{-4} \cdot 2^7 = \) __________
8. \( 0^4 \cdot 2^2 = \) __________
9. \( (2^{-3})^2 = \) __________
10. \( 3^{-2} \cdot 2^3 = \) __________
11. \( (-2)^{-2} \cdot (-2)^2 = \) __________
12. \( (-6)^{-2} = \) __________
13. \( 3^3 \cdot 3^{-4} = \) __________
14. \( \frac{7^2}{2^3} = \) __________
15. \( 4^2 \cdot 2^3 = \) __________

16. \( (-5)^2 \cdot (-5)^3 = \) __________
17. \( (-8)^2 \cdot (-7)^2 = \) __________
18. \( (-4)^2 \cdot (-6)^2 = \) __________
Integer Exponents—Skills Practice

Simplify more expressions with exponents.

Form B

Rewrite each expression using a single exponent.

1. \( y^3 \cdot y^{-5} = \) __________
2. \( m^{m/2} = \) __________
3. \( n^2 \cdot n^5 = \) __________

Evaluate each expression.

7. \( 2^4 \cdot 2^{-3} = \) __________
8. \( (-6)^3 \cdot (-6)^{-2} = \) __________
9. \( 4^{-3y} = \) __________

10. \( (3^y)^2 = \) __________
11. \( (-3)^x \cdot (-4)^y = \) __________
12. \( \frac{2^{y/2}}{2^{y/2}} = \) __________

13. \( 4^x \cdot 4^{-x} = \) __________
14. \( \frac{5}{3 \cdot 3} = \) __________
15. \( \frac{7 \cdot 2}{3 \cdot 1} = \) __________

16. \( 0^x \cdot 2^y = \) __________
17. \( (-6)^{y/3} = \) __________
18. \( (-6)^{-y} = \) __________

Integer Exponents—Repeated Reasoning

Name: __________________________

Find patterns in products of powers with the same base.

Expand each factor. Write the product in expanded form. Then write the product using an exponent. The first one is done for you.

1. \( 2^2 \times 2^4 = (2 \times 2) \times (2 \times 2) \times (2 \times 2) \times (2 \times 2) = 2^8 \)
2. \( 3^3 \times 3^2 = \) __________
3. \( 4^4 \times 4^1 = \) __________
4. \( 5^5 \times 5^1 = \) __________
5. \( 6^6 \times 6^2 = \) __________
6. \( 7^7 \times 7^1 = \) __________
7. \( 8^8 \times 8^1 = \) __________
8. \( 9^9 \times 9^2 = \) __________
9. \( n^1 \times n^1 = \) __________
10. \( 4.2^4 \times 4.2^1 = \) __________

Describe a pattern or relationship you see between the problems and the answers. Explain what the pattern means or why it happens.

Answers will vary. Sample answer: When the factors have the same base, the exponent of the product is equal to the sum of the exponents of the factors. Three factors of \( n \) multiplied by two factors of \( n \) is a total of five factors of \( n \).
### Integer Exponents—Repeated Reasoning

**Fluency Practice**

**Name:**

Find more patterns in products of powers with the same base. Write each expression as a power of a single number.

#### Set A

<table>
<thead>
<tr>
<th>Expression</th>
<th>Simplified</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3^2 \times 3^1$</td>
<td>$3^3$</td>
</tr>
<tr>
<td>$3^3 \times 3^2$</td>
<td>$3^5$</td>
</tr>
<tr>
<td>$3^1 \times 3^3$</td>
<td>$3^4$</td>
</tr>
<tr>
<td>$3^2 \times 3^3$</td>
<td>$3^5$</td>
</tr>
<tr>
<td>$3^3 \times 3^4$</td>
<td>$3^7$</td>
</tr>
<tr>
<td>$3^4 \times 3^3$</td>
<td>$3^7$</td>
</tr>
<tr>
<td>$3^3 \times 3^1$</td>
<td>$3^4$</td>
</tr>
<tr>
<td>$3^2 \times 3^4$</td>
<td>$3^6$</td>
</tr>
</tbody>
</table>

Describe a pattern you see in one of the sets of problems above.

**Answers will vary.** Students may notice in Set A that as the exponent of one factor increases by 1 the exponent of the answer increases by 1.

#### Set B

<table>
<thead>
<tr>
<th>Expression</th>
<th>Simplified</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3^1 \times 3^2$</td>
<td>$3^3$</td>
</tr>
<tr>
<td>$3^2 \times 3^1$</td>
<td>$3^3$</td>
</tr>
<tr>
<td>$3^3 \times 3^0$</td>
<td>$3^3$</td>
</tr>
<tr>
<td>$3^0 \times 3^1$</td>
<td>$3^1$</td>
</tr>
<tr>
<td>$3^1 \times 3^3$</td>
<td>$3^4$</td>
</tr>
<tr>
<td>$3^2 \times 3^2$</td>
<td>$3^4$</td>
</tr>
</tbody>
</table>

### Integer Exponents—Repeated Reasoning

**Fluency Practice**

**Name:**

Find patterns in quotients of powers with the same base. Expand each term in the quotient of powers. Write the quotient in expanded form. Then write the quotient using an exponent. The first one has been done for you.

**Answers will vary. Sample answer:** Students may see that when the dividend and divisor have the same base, the exponent of the quotient is equal to the difference of the exponents of the dividend and divisor. Five factors of $n$ divided by three factors of $n$ is a total of two factors of $n$. 

<table>
<thead>
<tr>
<th>Expression</th>
<th>Simplified</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2^1 \div 2^1 = (2 \times 2 \times 2 \div 2 \times 2 \div 2) = 2 \times 2 = 2^2$</td>
<td></td>
</tr>
<tr>
<td>$3^1 + 3^1 = [3 \times 3 \times 3 \times 3 \times 3] - [3 \times 3 \times 3] = 3 \times 3 = 3^2$</td>
<td></td>
</tr>
<tr>
<td>$4^1 + 4^1 = [4 \times 4 \times 4 \times 4 \times 4] - [4 \times 4 \times 4] = 4 \times 4 = 4^2$</td>
<td></td>
</tr>
<tr>
<td>$5^1 + 5^1 = [5 \times 5 \times 5 \times 5 \times 5] - [5 \times 5 \times 5] = 5 \times 5 = 5^2$</td>
<td></td>
</tr>
<tr>
<td>$6^1 + 6^1 = [6 \times 6 \times 6 \times 6 \times 6] - [6 \times 6 \times 6] = 6 \times 6 = 6^2$</td>
<td></td>
</tr>
<tr>
<td>$7^1 + 7^1 = [7 \times 7 \times 7 \times 7 \times 7] - [7 \times 7 \times 7] = 7 \times 7 = 7^2$</td>
<td></td>
</tr>
<tr>
<td>$8^1 + 8^1 = [8 \times 8 \times 8 \times 8 \times 8] - [8 \times 8 \times 8] = 8 \times 8 = 8^2$</td>
<td></td>
</tr>
<tr>
<td>$9^1 + 9^1 = [9 \times 9 \times 9 \times 9 \times 9] - [9 \times 9 \times 9] = 9 \times 9 = 9^2$</td>
<td></td>
</tr>
<tr>
<td>$n^1 + n^1 = (n \times n \times n \times n \times n) - (n \times n \times n) = n \times n = n^2$</td>
<td></td>
</tr>
<tr>
<td>$6.3^3 \div 6.3^1 = [6.3 \times 6.3 \times 6.3 \times 6.3 \times 6.3] - [6.3 \times 6.3 \times 6.3] = 6.3 \times 6.3 = 6.3^2$</td>
<td></td>
</tr>
</tbody>
</table>
Find more patterns in quotients of powers with the same base.

Expand each term in the quotient of powers. Write the quotient in expanded form. Then write the quotient using an exponent. The first one has been done for you.

**Set A**

1. \(2^4 \div 2^3 = \frac{(2 \times 2 \times 2 \times 2)}{(2 \times 2 \times 2)} = 2 \times 2 = 2^2\)
2. \(2^5 \div 2^4 = \frac{(2 \times 2 \times 2 \times 2 \times 2)}{(2 \times 2 \times 2 \times 2)} = 2 \times 2 = 2^2\)
3. \(2^8 \div 2^7 = \frac{(2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2)}{(2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2)} = 2 \times 2 = 2^2\)
4. \(2^5 \div 2^3 = \frac{(2 \times 2 \times 2 \times 2 \times 2)}{(2 \times 2 \times 2)} = 2 \times 2 = 2^2\)
5. \(2^6 \div 2^3 = \frac{(2 \times 2 \times 2 \times 2 \times 2 \times 2)}{(2 \times 2 \times 2)} = 2 \times 2 = 2^2\)
6. \(2^9 \div 2^4 = \frac{(2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2)}{(2 \times 2 \times 2 \times 2 \times 2 \times 2)} = 2 \times 2 = 2^2\)

**Set B**

1. \(4.3^4 \div 4.3^3 = \frac{(4.3 \times 4.3 \times 4.3 \times 4.3)}{(4.3 \times 4.3 \times 4.3)} = 4.3 \times 4.3 = 4.3^2\)
2. \(4.3^5 \div 4.3^3 = \frac{(4.3 \times 4.3 \times 4.3 \times 4.3 \times 4.3)}{(4.3 \times 4.3 \times 4.3)} = 4.3 \times 4.3 = 4.3^2\)

Describe a pattern or relationship you see between the problems and the answers. Explain what the pattern means or why it happens.

**Answers will vary. Students may notice that if the exponent in the divisor increases by 1, the exponent in the quotient decreases by 1. That happens because you are dividing by one more factor, so the result has one fewer factor.**

Find patterns in products of powers with different bases.

Expand each factor. Rewrite the expanded form as a power of a product. Then simplify. The first one has been done for you.

**Set A**

1. \(2^3 \times 4^1 = (2 \times 2 \times 2) \times 4 = 8^1\)
2. \(2^3 \times 4^1 = (2 \times 2 \times 2) \times 4 = 8^1\)
3. \(2^5 \times 4^1 = 2 \times 2 \times 2 \times 2 \times 2 \times 4 = (2 \times 4)^1 = 8^1\)
4. \(3^3 \times 5^1 = 3 \times 3 \times 3 \times 5 = (3 \times 5)^1 = 15^1\)
5. \(n^3 \times m^1 = n \times n \times n \times m = (n \times m)^1 = (nm)^1\)

**Set B**

1. \(10^3 \times 5^1 = 10 \times 10 \times 10 \times 5 = 2 \times 5^1\)
2. \(10^3 \times 5^1 = 10 \times 10 \times 10 \times 5 = 2 \times 5^1\)
3. \(10^3 \times 5^1 = 10 \times 10 \times 10 \times 5 = 2 \times 5^1\)
4. \(6^1 = (2 \times 3)^1 = 2 \times 3 = 2^1 \times 3^1\)
5. \((m \times n)^1 = m \times n = m^1 \times n^1\)

Describe a pattern you see in one of the sets of problems above.

**Answers will vary. Sample answer: Students may see in Set B that when there is more than one factor inside the parentheses, each factor is raised to the power.**
Scientific Notation—Skills Practice
Name: ___________________

Write the numbers in scientific notation.

1. $4,500 = 4.5 \times 10^3$
2. $0.0578 = 5.78 \times 10^{-2}$
3. $37 = 5.7 \times 10^3$
4. $0.006256 = 6.256 \times 10^{-4}$
5. $730 = 7.3 \times 10^2$
6. $25.63 = 2.563 \times 10^1$
7. $0.007 = 7.0 \times 10^{-3}$
8. $0.00042 = 4.2 \times 10^{-4}$
9. $300.25 = 3.0025 \times 10^2$
10. $0.1456 = 1.456 \times 10^{-1}$
11. $56,325.2 = 5.63252 \times 10^4$

Write the numbers in standard form.

13. $7.65 \times 10^4 = 7,650$
14. $5.21 \times 10^{-1} = 0.521$
15. $7.528 \times 10^3 = 752.8$
16. $2.169 \times 10^{-1} = 0.02169$
17. $2.7345 \times 10^2 = 27,345$
18. $4.6 \times 10^1 = 460$
19. $8.752 \times 10^2 = 875,200$
20. $5.0 \times 10^{-1} = 0.5 $
21. $8.0 \times 10^4 = 80,000,000$
22. $5.639 \times 10^{-2} = 0.05639$
23. $1.3 \times 10^{-3} = 0.0013$
24. $5.3725 \times 10^4 = 53,725$

Write the numbers in scientific notation.

1. $6.500 = 6.5 \times 10^0$
2. $0.0354 = 3.54 \times 10^{-2}$
3. $69 = 6.9 \times 10^1$
4. $0.007257 = 7.257 \times 10^{-4}$
5. $820 = 8.2 \times 10^2$
6. $0.000053 = 5.3 \times 10^{-5}$
7. $0.002 = 2.0 \times 10^{-3}$
8. $37.85 = 3.785 \times 10^1$
9. $400.75 = 4.0075 \times 10^2$
10. $0.2531 = 2.531 \times 10^{-2}$
11. $76,213.8 = 7.62138 \times 10^4$
12. $1,876.4 = 1.8764 \times 10^3$

Write the numbers in standard form.

13. $8.72 \times 10^2 = 8,720$
14. $3.79 \times 10^{-1} = 0.379$
15. $3.628 \times 10^3 = 362.8$
16. $9.786 \times 10^{-4} = 0.009786$
17. $1.4278 \times 10^1 = 14.278$
18. $3.4 \times 10^{-3} = 0.00034$
19. $6.251 \times 10^3 = 625,100$
20. $4.0 \times 10^{-1} = 0.4$
21. $9.0 \times 10^3 = 900,000$
22. $6.213 \times 10^{-3} = 0.06213$
23. $4.1723 \times 10^3 = 41,723$
24. $4.6 \times 10^{-3} = 0.00046$
Perform operations with numbers written in scientific notation. Write your answers in standard form.

**Form A**

1. \((4.2 \times 10^4) \times (2 \times 10^3) = \) \(84,000,000\)

2. \((2.8 \times 10^4) - (7 \times 10^3) = \) \(4,000,000\)

3. \((3.9 \times 10^3) + (4.1 \times 10^2) = \) \(44,900,000\)

4. \((5.05 \times 10^2) - (5.05 \times 10^2) = \) \(0.1\)

5. \((3.21 \times 10^4) \times (4.6 \times 10^3) = \) \(14,766\)

6. \((4.5 \times 10^3) + (1.1 \times 10^3) = \) \(45,011\)

7. \((2.65 \times 10^3) - (1.21 \times 10^3) = \) \(1,440\)

8. \((7.5 \times 10^3) + (8.6 \times 10^3) = \) \(860.075\)

9. \((6.21 \times 10^7) - (4.32 \times 10^7) = \) \(0.061668\)

10. \((8.6 \times 10^7) + (9.4 \times 10^7) = \) \(1,800\)

11. \((2.6 \times 10^9) \times (3.8 \times 10^5) = \) \(988\)

12. \((1.7 \times 10^9) + (2.59 \times 10^9) = \) \(0.1959\)

13. \(\frac{4.62 \times 10^7}{2.2 \times 10^6} = \) \(2.100\)

14. \((4.25 \times 10^4) \times (3.5 \times 10^3) = \) \(14.875\)

**Form B**

1. \((3.1 \times 10^4) \times (3 \times 10^3) = \) \(93,000,000\)

2. \((3.6 \times 10^4) - (4 \times 10^3) = \) \(9,000,000\)

3. \((2.7 \times 10^4) + (5.1 \times 10^2) = \) \(33,700,000\)

4. \((6.39 \times 10^4) - (3 \times 10^2) = \) \(21.3\)

5. \((4.78 \times 10^4) \times (2.1 \times 10^3) = \) \(10,038\)

6. \((5.84 \times 10^4) + (6.2 \times 10^3) = \) \(58,462\)

7. \((3.85 \times 10^3) - (1.41 \times 10^3) = \) \(2,440\)

8. \((3.5 \times 10^2) + (7.9 \times 10^1) = \) \(790.035\)

9. \((5.31 \times 10^3) - (2.34 \times 10^3) = \) \(0.052866\)

10. \((7.2 \times 10^3) + (8.7 \times 10^2) = \) \(1,590\)

11. \((4.6 \times 10^2) \times (2.8 \times 10^3) = \) \(1,288\)

12. \((1.9 \times 10^1) + (3.69 \times 10^1) = \) \(0.2269\)

13. \(\frac{1.725 \times 10^5}{7.3 \times 10^2} = \) \(230\)

14. \((4.87 \times 10^4) \times (4.3 \times 10^3) = \) \(209.41\)
### Fluency Practice

#### Solutions to Linear Equations—Skills Practice

**Name:**

<table>
<thead>
<tr>
<th>Solve and tell whether the equation has 1 solution, no solution, or infinitely many solutions.</th>
<th>Form A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. $-3x + 8 - 5x = 21 - 8x$ no solution</td>
<td></td>
</tr>
<tr>
<td>2. $-2y + 7 + 5y = 13 - 2y$ 1 solution: $y = 4$</td>
<td></td>
</tr>
<tr>
<td>3. $12 - 8z = -20 - 4z$ 1 solution: $z = 8$</td>
<td></td>
</tr>
<tr>
<td>4. $7 + 2f = 9 + 4f$ 1 solution: $f = -1$</td>
<td></td>
</tr>
<tr>
<td>5. $6 + 3m - 4 = -5 + 3m + 7$ infinitely many solutions</td>
<td></td>
</tr>
<tr>
<td>6. $d + 6 + 2d = 4d + 9$ 1 solution: $d = -3$</td>
<td></td>
</tr>
<tr>
<td>7. $4p - 4 = 3p - 3$ 1 solution: $x = 1$</td>
<td></td>
</tr>
<tr>
<td>8. $4c + 12 = c - 3$ 1 solution: $c = -3$</td>
<td></td>
</tr>
<tr>
<td>9. $7d - 8 = 3d - 8$ 1 solution: $d = 0$</td>
<td></td>
</tr>
<tr>
<td>10. $-9n - 8 = -10n - 7$ 1 solution: $n = 1$</td>
<td></td>
</tr>
<tr>
<td>11. $6 + 8b = -6 + 2b$ 1 solution: $b = -2$</td>
<td></td>
</tr>
<tr>
<td>12. $7g + 5 - 2g = 5 + 5g$ infinitely many solutions</td>
<td></td>
</tr>
</tbody>
</table>

---

### Solutions to Linear Equations—Skills Practice

**Name:**

<table>
<thead>
<tr>
<th>Solve and tell whether the equation has 1 solution, no solution, or infinitely many solutions.</th>
<th>Form B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. $-3x - 8 + 5x = 17 - 3x$ 1 solution: $x = 5$</td>
<td></td>
</tr>
<tr>
<td>2. $-4a + 6 - 2a = 12 - 6a$ no solution</td>
<td></td>
</tr>
<tr>
<td>3. $14 - 7z = -22 - 3z$ 1 solution: $z = 9$</td>
<td></td>
</tr>
<tr>
<td>4. $9 + 4g - 6 = -3 + 4g + 6$ infinitely many solutions</td>
<td></td>
</tr>
<tr>
<td>5. $8 + 3d = 10 + 5d$ 1 solution: $d = -1$</td>
<td></td>
</tr>
<tr>
<td>6. $5w - 5 = 4w - 4$ 1 solution: $w = 1$</td>
<td></td>
</tr>
<tr>
<td>7. $c + 7 + 3c = 5c + 11$ 1 solution: $c = -4$</td>
<td></td>
</tr>
<tr>
<td>8. $9 + 6p = -9 - 3p$ 1 solution: $p = -2$</td>
<td></td>
</tr>
<tr>
<td>9. $5f + 14 = f - 6$ 1 solution: $f = -5$</td>
<td></td>
</tr>
<tr>
<td>10. $9h - 7 = 4h - 7$ 1 solution: $h = 0$</td>
<td></td>
</tr>
<tr>
<td>11. $6z + 3 - 3z = 3 + 3z$ infinitely many solutions</td>
<td></td>
</tr>
<tr>
<td>12. $-96 - 10 = -10b - 9$ 1 solution: $b = 1$</td>
<td></td>
</tr>
</tbody>
</table>
### Solutions to Linear Equations—Skills Practice

**Name: ____________________________**

**Form A**

Use the distributive property as needed to solve and tell whether the equation has 1 solution, no solution, or infinitely many solutions.

1. $6x - 12 = 6(x - 2)$
   - **Answer:** infinitely many solutions

2. $\frac{2}{3} - \frac{1}{6}m = \frac{5}{6}m - \frac{3}{5}$
   - **Answer:** 1 solution: $m = 4$

3. $-15x - 4 + 6x = -4 - 9x$
   - **Answer:** infinitely many solutions

4. $7(y - 6) = 7y + 42$
   - **Answer:** no solution

5. $4(p + 5) = 6p + 20$
   - **Answer:** 1 solution: $p = 0$

6. $3m + 11 = \frac{1}{2}(8m + 33)$
   - **Answer:** infinitely many solutions

7. $15y - 4 = 12y - 28$
   - **Answer:** 1 solution: $y = -8$

8. $-8 + 2n + 14 = 4n - 16$
   - **Answer:** 1 solution: $n = 11$

9. $-\frac{1}{2}(4a + 8) = -2a + 4$
   - **Answer:** no solution

10. $3(m - 4) = 6m - 15$
    - **Answer:** 1 solution: $m = 1$

11. $8(2y + 5) = 9y + 12$
    - **Answer:** 1 solution: $y = -4$

12. $3n + 14 = 3n + 5$
    - **Answer:** 1 solution: $n = 9$

**Form B**

Use the distributive property as needed to solve and tell whether the equation has 1 solution, no solution, or infinitely many solutions.

1. $\frac{2}{3} - \frac{1}{6}m = \frac{5}{6}m - \frac{3}{5}$
   - **Answer:** 1 solution: $m = 4$

2. $7x - 14 = 7(x - 2)$
   - **Answer:** infinitely many solutions

3. $7(p + 4) = 9p + 28$
   - **Answer:** 1 solution: $p = 0$

4. $-16x - 8 + 9x = -8 - 7x$
   - **Answer:** infinitely many solutions

5. $4m + 11 = \frac{1}{2}(32m + 88)$
   - **Answer:** infinitely many solutions

6. $8(y - 7) = 8y + 56$
   - **Answer:** no solution

7. $-9 + 4n + 18 = 7n - 24$
   - **Answer:** 1 solution: $n = 11$

8. $16y - 6 = 11y - 27$
   - **Answer:** 1 solution: $y = -7$

9. $5(m - 3) = 7m - 17$
    - **Answer:** 1 solution: $m = 1$

10. $-\frac{1}{2}(8a + 20) = -2a + 5$
    - **Answer:** no solution

11. $7(y + 5) = 19y + 8$
    - **Answer:** 1 solution: $y = -3$

12. $-9n - 8 = 3n + 6n - 8$
    - **Answer:** 1 solution: $n = 0$
Systems of Equations—Skills Practice

Solve systems of equations using substitution.

**Form A**

1. \( y = 4x \)
   \[ 2y + 2.5x = 105 \]
   \[ x = 10, y = 40 \]

2. \( x + 10 = -8y \)
   \[ -8y + x = 6 \]
   \[ x = -2, y = -1 \]

3. \( x = -6y \)
   \[ 3x + 6y = -24 \]
   \[ x = -12, y = 2 \]

4. \( x - 9 = 7y \)
   \[ 7y + x = -19 \]
   \[ x = -5, y = -2 \]

5. \( y = 7x \)
   \[ -2x + y = 15 \]
   \[ x = 3, y = 21 \]

6. \( x + 5 = -4y \)
   \[ -4y + x = 43 \]
   \[ x = 19, y = -6 \]

7. \( x = -1 = \frac{1}{2}y \)
   \[ \frac{1}{2}y + x = 11 \]
   \[ x = 6, y = 10 \]

8. \( y = \frac{1}{15} \)
   \[ -6x + 3y = 30 \]
   \[ x = -6, y = 2 \]

9. \( x = 1.5y \)
   \[ -8x - 2y = -84 \]
   \[ x = 9, y = 6 \]

10. \( y = 0.5x \)
    \[ 8y - 6x = -20 \]
    \[ x = 10, y = 5 \]

**Form B**

1. \( x = 7y \)
   \[ 3x + 2y = 23 \]
   \[ x = 7, y = 1 \]

2. \( x = 4y \)
   \[ 0.5y + 2x = 85 \]
   \[ x = 40, y = 10 \]

3. \( x - 6 = 5y \)
   \[ 5y + x = -24 \]
   \[ x = -9, y = -3 \]

4. \( x = 9y \)
   \[ 5x + 3y = -48 \]
   \[ x = -9, y = -1 \]

5. \( y = \frac{1}{15} \)
   \[ -7x + 5y = 60 \]
   \[ x = 10, y = -2 \]

6. \( x - 8 = \frac{1}{6}y \)
   \[ \frac{1}{6}y + x = 10 \]
   \[ x = 9, y = 6 \]

7. \( y = 3x \)
   \[ -2x + y = 5 \]
   \[ x = 5, y = 15 \]

8. \( x + 7 = -3y \)
   \[ -3y + x = 41 \]
   \[ x = 17, y = -8 \]

9. \( y = 1.5x \)
   \[ 10y - 3x = 96 \]
   \[ x = 8, y = 12 \]

10. \( x + 7 = 8y \)
    \[ 8y + x = 9 \]
    \[ x = 1, y = 1 \]
Solve systems of equations using any method.

**Form A**

1. \(3x - 4y = 7\)  
   \(3x - 4y = 9\)  
   no solution

2. \(10x - 15y = 30\)  
   \(2x - 4y = 4\)  
   \(x = 6, y = 2\)

3. \(y = 2x\)  
   \(4y + 3x = 55\)  
   \(x = 5, y = 10\)

4. \(6x + 2y = 20\)  
   \(3x + 2y = 8\)  
   \(x = 4, y = -2\)

5. \(14y - 7x = 21\)  
   \(x - 2y = -3\)  
   infinitely many solutions

6. \(9x - 6y = 3\)  
   \(-9x + 4y = 7\)  
   \(x = -3, y = -\frac{3}{2}\)

7. \(7y + 8x = 15\)  
   \(3y + 8x = 11\)  
   \(x = 1, y = 1\)

8. \(7x - 6y = 4\)  
   \(-6y + 7x = 5\)  
   no solution

9. \(5x - 4y = 9\)  
   \(3x + 8y = -5\)  
   \(x = 1, y = -1\)

10. \(x + 4 = 6y\)  
    \(6y + x = 8\)  
    \(x = 2, y = 1\)

**Form B**

1. \(20x - 10y = 50\)  
   \(10x - 15y = -5\)  
   \(x = 4, y = -5\)

2. \(2x - 6y = 8\)  
   \(2x - 6y = 3\)  
   no solution

3. \(y = 3x\)  
   \(5y + 5x = 40\)  
   \(x = 2, y = 6\)

4. \(7x + 4y = 30\)  
   \(3x + 4y = 6\)  
   \(x = 6, y = -3\)

5. \(8x - 4y = 4\)  
   \(-8x + 2y = 6\)  
   \(x = -2, y = -\frac{3}{2}\)

6. \(15y - 5x = 20\)  
   \(x - 3y = -4\)  
   infinitely many solutions

7. \(8x - 4y = 3\)  
   \(-4x + 8x = 9\)  
   no solution

8. \(9y + 6x = 15\)  
   \(2y + 6x = 8\)  
   \(x = 1, y = 1\)

9. \(10x + 4y = 8\)  
   \(5x + 8y = 16\)  
   \(x = 0, y = 2\)

10. \(x - 2y = 7\)  
    \(3y + 5x = -21\)  
    \(x = -6, y = 3\)
### Systems of Equations—Skills Practice

**Form A**

Solve systems of equations involving fractions and decimals.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$x = 0.5y$</td>
<td>2</td>
<td>$2x + 3y = 5$</td>
</tr>
<tr>
<td></td>
<td>$6x + 2y = 20$</td>
<td></td>
<td>$0.25x + 0.25y = 0.5$</td>
</tr>
<tr>
<td></td>
<td>$x = 2, y = 4$</td>
<td></td>
<td>$x = 1, y = 1$</td>
</tr>
<tr>
<td>3</td>
<td>$\frac{3}{4}x + \frac{2}{3}y = 20$</td>
<td>4</td>
<td>$x = \frac{1}{2}y$</td>
</tr>
<tr>
<td></td>
<td>$2x - 7y = -120$</td>
<td></td>
<td>$12x - 4y = 8$</td>
</tr>
<tr>
<td></td>
<td>$x = 10, y = 20$</td>
<td></td>
<td>$x = -2, y = -8$</td>
</tr>
<tr>
<td>5</td>
<td>$4x + 5y = 42$</td>
<td>6</td>
<td>$-8x - 7y = 3$</td>
</tr>
<tr>
<td></td>
<td>$\frac{2}{3}x - \frac{1}{2}y = 1$</td>
<td></td>
<td>$\frac{5}{6}x + \frac{2}{3}y = \frac{3}{10}$</td>
</tr>
<tr>
<td></td>
<td>$x = 3, y = 6$</td>
<td></td>
<td>no solution</td>
</tr>
<tr>
<td>7</td>
<td>$\frac{1}{3}x + \frac{1}{2}y = 2$</td>
<td>8</td>
<td>$x = \frac{1}{2}y$</td>
</tr>
<tr>
<td></td>
<td>$x + 2y = 16$</td>
<td></td>
<td>$36x - 2y = 24$</td>
</tr>
<tr>
<td></td>
<td>infinitely many solutions</td>
<td></td>
<td>$x = 1, y = 6$</td>
</tr>
<tr>
<td>9</td>
<td>$6x - 5y = 36$</td>
<td>10</td>
<td>$2.5x + 5y = 50$</td>
</tr>
<tr>
<td></td>
<td>$0.5x + 2.5y = 3$</td>
<td></td>
<td>$1.25x + 1.5y = 21$</td>
</tr>
<tr>
<td></td>
<td>$x = 6, y = 0$</td>
<td></td>
<td>$x = 12, y = 4$</td>
</tr>
</tbody>
</table>

**Form B**

Solve systems of equations involving fractions and decimals.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$x = -0.5y$</td>
<td>2</td>
<td>$-6x + 12y = 14$</td>
</tr>
<tr>
<td></td>
<td>$8x + 6y = 12$</td>
<td></td>
<td>$1.5x - 3y = -3.5$</td>
</tr>
<tr>
<td></td>
<td>$x = -3, y = 6$</td>
<td></td>
<td>infinitely many solutions</td>
</tr>
<tr>
<td>3</td>
<td>$4x - 7y = 32$</td>
<td>4</td>
<td>$2x + 6y = 8$</td>
</tr>
<tr>
<td></td>
<td>$0.5x + 3.5y = 4$</td>
<td></td>
<td>$0.25x + 0.25y = 0.5$</td>
</tr>
<tr>
<td></td>
<td>$x = 8, y = 0$</td>
<td></td>
<td>$x = 1, y = 1$</td>
</tr>
<tr>
<td>5</td>
<td>$\frac{3}{2}x + \frac{1}{10}y = 13$</td>
<td>6</td>
<td>$y = \frac{1}{3}x$</td>
</tr>
<tr>
<td></td>
<td>$2x - 3y = -80$</td>
<td></td>
<td>$3x - 25y = 20$</td>
</tr>
<tr>
<td></td>
<td>$x = 5, y = 30$</td>
<td></td>
<td>$x = -10, y = -2$</td>
</tr>
<tr>
<td>7</td>
<td>$\frac{1}{3}x + \frac{1}{2}y = 3$</td>
<td>8</td>
<td>$4x + y = 12$</td>
</tr>
<tr>
<td></td>
<td>$2x + y = 30$</td>
<td></td>
<td>$\frac{1}{3}x - \frac{2}{3}y = -2$</td>
</tr>
<tr>
<td></td>
<td>infinitely many solutions</td>
<td></td>
<td>$x = 0, y = 12$</td>
</tr>
<tr>
<td>9</td>
<td>$-6x - 3y = 5$</td>
<td>10</td>
<td>$2x + 5y = 24$</td>
</tr>
<tr>
<td></td>
<td>$\frac{2}{5}x + \frac{3}{4}y = \frac{3}{8}$</td>
<td></td>
<td>$\frac{1}{2}x - \frac{2}{3}y = -2$</td>
</tr>
<tr>
<td></td>
<td>$\frac{2}{5}x - \frac{3}{4}y = \frac{3}{8}$</td>
<td></td>
<td>$x = 2, y = 4$</td>
</tr>
</tbody>
</table>

©Curriculum Associates, LLC  Copying is permitted for classroom use.
Fluency Practice

Linear Functions—Skills Practice

Find the slope of the line through two given points.

**Form A**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(7, 7) and (9, 9)</td>
</tr>
<tr>
<td>2</td>
<td>(8, 11) and (5, 5)</td>
</tr>
<tr>
<td>3</td>
<td>(0, 0) and (6, 5)</td>
</tr>
<tr>
<td>4</td>
<td>(6, 6) and (14, 14)</td>
</tr>
<tr>
<td>5</td>
<td>($\frac{2}{4}, \frac{5}{2}$) and ($\frac{1}{4}, \frac{3}{2}$)</td>
</tr>
<tr>
<td>6</td>
<td>(0, 0) and (9, 4)</td>
</tr>
<tr>
<td>7</td>
<td>(1, 1) and (3, 9)</td>
</tr>
<tr>
<td>8</td>
<td>(9, 6) and (4, 9)</td>
</tr>
<tr>
<td>9</td>
<td>(2, 5) and (5, 8)</td>
</tr>
<tr>
<td>10</td>
<td>(6, 10) and (14, 14)</td>
</tr>
<tr>
<td>11</td>
<td>($\frac{1}{4}, \frac{3}{4}$) and ($\frac{1}{4}, \frac{3}{4}$)</td>
</tr>
<tr>
<td>12</td>
<td>(-2, -3) and (-1, -6)</td>
</tr>
<tr>
<td>13</td>
<td>(-1, -4) and (3, 12)</td>
</tr>
<tr>
<td>14</td>
<td>(0, 0) and (6, 5)</td>
</tr>
<tr>
<td>15</td>
<td>(6, 3) and (-6, 6)</td>
</tr>
<tr>
<td>16</td>
<td>(5, 6) and (9, 8)</td>
</tr>
<tr>
<td>17</td>
<td>(5, 9) and (3, 11)</td>
</tr>
<tr>
<td>18</td>
<td>(2, 2) and (4, 4)</td>
</tr>
<tr>
<td>19</td>
<td>(8, 5) and (4, 7)</td>
</tr>
<tr>
<td>20</td>
<td>(3, 8) and (4, 6)</td>
</tr>
<tr>
<td>21</td>
<td>(9, 6) and (4, 9)</td>
</tr>
</tbody>
</table>

**Form B**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(7, 10) and (4, 4)</td>
</tr>
<tr>
<td>2</td>
<td>(6, 6) and (14, 14)</td>
</tr>
<tr>
<td>3</td>
<td>(-3, -4) and (-2, -7)</td>
</tr>
<tr>
<td>4</td>
<td>(0, 0) and (9, 4)</td>
</tr>
<tr>
<td>5</td>
<td>(-1, -10) and (4, 15)</td>
</tr>
<tr>
<td>6</td>
<td>(2, 4) and (4, 6)</td>
</tr>
<tr>
<td>7</td>
<td>($\frac{1}{4}, \frac{3}{4}$) and ($\frac{3}{4}, \frac{5}{4}$)</td>
</tr>
<tr>
<td>8</td>
<td>($\frac{-1}{3}, \frac{-1}{3}$) and (-2, 2)</td>
</tr>
<tr>
<td>9</td>
<td>(2, 7) and (6, 9)</td>
</tr>
<tr>
<td>10</td>
<td>(-2, -5) and (-4, -11)</td>
</tr>
<tr>
<td>11</td>
<td>(-7, 16) and (-4, 18)</td>
</tr>
<tr>
<td>12</td>
<td>(9, 6) and (-9, -9)</td>
</tr>
<tr>
<td>13</td>
<td>(6, 3) and (-6, 6)</td>
</tr>
<tr>
<td>14</td>
<td>(5, 6) and (9, 8)</td>
</tr>
<tr>
<td>15</td>
<td>(-3, 0) and (0, -10)</td>
</tr>
<tr>
<td>16</td>
<td>(0, -6) and (-8, 0)</td>
</tr>
<tr>
<td>17</td>
<td>(6, 7) and (1, 12)</td>
</tr>
<tr>
<td>18</td>
<td>(9, 6) and (4, -9)</td>
</tr>
<tr>
<td>19</td>
<td>(2, -1) and (7, 2)</td>
</tr>
<tr>
<td>20</td>
<td>(6, 8) and (9, 8)</td>
</tr>
</tbody>
</table>
Fluency Practice

Linear Functions—Skills Practice

Name: ________________

Determine the rate of change and the initial value of the line through two given points.

Form A

1. (5, 14) and (3, 10)
   Rate of change = 2
   Initial value = 4

2. (9, 32) and (4, 17)
   Rate of change = 3
   Initial value = 5

3. (8, 5) and (4, 7)
   Rate of change = -1
   Initial value = 9

4. (4, 8) and (12, 10)
   Rate of change = 1
   Initial value = 7

5. (3, 13) and (6, 14)
   Rate of change = 1
   Initial value = 3

6. (3, 1) and (12, 2)
   Rate of change = -1
   Initial value = 1

7. (1, 6) and (6, 1)
   Rate of change = 5
   Initial value = 5

8. (3, 8) and (12, 2)
   Rate of change = 1
   Initial value = 1

9. (4, 1) and (8, 2)
   Rate of change = 1
   Initial value = 2

10. (1, 3) and (3, 9)
    Rate of change = 3
    Initial value = 0

11. (2, 6) and (4, 6)
    Rate of change = 0
    Initial value = 8

12. (5, 12) and (2, 6)
    Rate of change = 2
    Initial value = 2

Give the rate of change and the initial value from each description.

13. Yamini starts a savings account with $12. She will put in an equal amount each week. After 6 weeks, she will have $54.
    Rate of change per week = 57
    Initial value = $12

14. Jordan has some music books. He will buy 9 new music books each year. He will have 52 music books in 5 years.
    Rate of change per year = 9
    Initial value = 514

Form B

1. (1, 4) and (3, 12)
   Rate of change = 4
   Initial value = 0

2. (5, 18) and (2, 9)
   Rate of change = 3
   Initial value = 3

3. (5, 1) and (10, 2)
   Rate of change = 1
   Initial value = 0

4. (0, 5) and (8, 5)
   Rate of change = 0
   Initial value = 4

5. (1, 6) and (6, 16)
   Rate of change = 5
   Initial value = 5

6. (8, 30) and (5, 21)
   Rate of change = 5
   Initial value = 5

7. (1, 3) and (3, 9)
   Rate of change = -1
   Initial value = 4

8. (4, 7) and (12, 9)
   Rate of change = 1
   Initial value = 6

9. (3, 11) and (5, 11)
   Rate of change = 0
   Initial value = 11

10. (8, 4) and (4, 6)
    Rate of change = -1
    Initial value = 2

11. (6, 16) and (9, 17)
    Rate of change = 1
    Initial value = 3

12. (6, 8) and (15, 2)
    Rate of change = -2
    Initial value = 12

Give the rate of change and the initial value from each description.

13. Kahn starts a savings account with $14. He will put in an equal amount each week. After 7 weeks, he will have $56.
    Rate of change per week = $2
    Initial value = $14

14. Addison has some puzzle books. She will buy 7 new puzzle books each year. She will have 43 puzzle books in 5 years.
    Rate of change per year = $7
    Initial value = 8
Linear Functions—Skills Practice

Name: ______________________

One possible answer is given.

Form A

Identify another point on the line given one point and the slope.

1. (7, 7) and slope = 2
   (5, 5) and slope = 0

3. (0, 0) and slope = 3
   (1, 3)

5. (5, 5) and slope = 5
   (2, 2)

7. (3, 3) and slope = 0
   (3, 3)

9. (2, 2) and slope = 1
   (3, 8)

11. (7, 7) and slope = 5
    (2, 4)

13. (4, 4) and slope = 2
    (5, 0)

15. (3, 4) and slope = 3
    (0, 0)

17. (0, -2) and slope = -\( \frac{1}{2} \)
    (2, -3)

19. (2, -3) and slope = 1
    (3, -3)

21. (1, 1) and slope = -3
    (2, -2)

23. (2, 4) and slope = -1
    (3, 3)

25. (1, -1) and slope = 8
    (9, 16)

27. (4, 1) and slope = 5
    (0, 0)

29. (2, 2) and slope = 2
    (3, 4)

31. (3, 5) and slope = 3
    (4, -2)

33. (0, -2) and slope = -5
    (1, -7)

35. (6, 6) and slope = 1
    (1, -3)

37. (3, 4) and slope = -3
    (5, 1)

39. (0, 0) and slope = -\( \frac{3}{5} \)
    (8, 2)

41. (5, 5) and slope = -2
    (6, 3)

43. (2, -2) and slope = \( \frac{1}{3} \)
    (3, 2)

45. (8, 8) and slope = 3
    (9, 16)

Linear Functions—Skills Practice

Name: ______________________

One possible answer is given.

Form B

Identify another point on the line given one point and the slope.

1. (6, 7) and slope = 0
   (7, 7)

3. (4, -3) and slope = -1
   (3, 4)

5. (0, 0) and slope = 1
   (4, 12)

7. (4, -9) and slope = 0
   (5, -9)

9. (4, -8) and slope = 3
   (5, -5)

11. (5, 5) and slope = 0
    (5, 5)

13. (6, 2) and slope = 3
    (1, 5)

15. (8, 9) and slope = 1
    (9, 10)

17. (1, 4) and slope = 4
    (2, -1)

19. (0, 0) and slope = 1
    (1, 4)

21. (8, 8) and slope = 3
    (9, 16)

23. (2, 4) and slope = -1
    (3, 3)

25. (1, 1) and slope = 2
    (3, 2)

27. (8, 8) and slope = 3
    (7, 5)