Rational and Irrational Numbers—Skills Practice

Name: _____

Evaluate square roots and cube roots. Simplify each expression. **Form A**

1. $\sqrt{16} =$ 4
2. $\sqrt[3]{0} =$ 0
3. $\sqrt{1} =$ 1
4. $\sqrt{64} =$ 8
5. $\sqrt{144} =$ 12
6. $\sqrt{169} =$ 13
7. $\sqrt[3]{8} =$ 2
8. $\sqrt{100} =$ 10
9. $\sqrt{49} =$ 7
10. $\sqrt[3]{27} =$ 3
11. $\sqrt[3]{125} =$ 5
12. $\sqrt{2{,}500} =$ 50
13. $\sqrt[3]{64} =$ 4
14. $\sqrt{900} =$ 30
15. $\sqrt{36} =$ 6
16. $\sqrt{441} =$ 21
17. $\sqrt[3]{1{,}000} =$ 10
18. $\sqrt{25} =$ 5

Rational and Irrational Numbers—Skills Practice

Name: _____

Evaluate square roots and cube roots. Simplify each expression. **Form B**

1. $\sqrt{9} =$ 3
2. $\sqrt[3]{1} =$ 1
3. $\sqrt{0} =$ 0
4. $\sqrt{81} =$ 9
5. $\sqrt{121} =$ 11
6. $\sqrt[3]{1{,}000} =$ 10
7. $\sqrt[3]{27} =$ 3
8. $\sqrt{25} =$ 5
9. $\sqrt{4} =$ 2
10. $\sqrt{225} =$ 15
11. $\sqrt{400} =$ 20
12. $\sqrt{216} =$ 6
13. $\sqrt{64} =$ 8
14. $\sqrt{1{,}600} =$ 40
15. $\sqrt{625} =$ 25
16. $\sqrt[3]{8} =$ 2
17. $\sqrt[3]{512} =$ 8
18. $\sqrt{961} =$ 31

Rational and Irrational Numbers—Skills Practice

Name: _____

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

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

Rational and Irrational Numbers—Skills Practice

Name: _____

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

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

Rational and Irrational Numbers—Skills Practice

Name: _____

Approximate irrational numbers. **Form A**

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. $\sqrt{8}$ 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. $\sqrt{5} \approx$ 2
11. $\sqrt{10} \approx$ 3
12. $\sqrt{8} \approx$ 3
13. $\sqrt{28} \approx$ 5
14. $\sqrt{23} \approx$ 5
15. $\sqrt{84} \approx$ 9
16. $\sqrt{45} \approx$ 7
17. $\sqrt{29} \approx$ 5
18. $\sqrt{70} \approx$ 8

Approximate to the nearest tenth.

19. $\sqrt{5} \approx$ 2.2
20. $\sqrt{10} \approx$ 3.2
21. $\sqrt{8} \approx$ 2.8
22. $\sqrt{28} \approx$ 5.3
23. $\sqrt{23} \approx$ 4.8
24. $\sqrt{84} \approx$ 9.2

Approximate to the nearest hundredth.

25. $\sqrt{5} \approx$ 2.24
26. $\sqrt{10} \approx$ 3.16
27. $\sqrt{8} \approx$ 2.83

Rational and Irrational Numbers—Skills Practice

Name: _____

Approximate irrational numbers. **Form B**

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. $\sqrt{24}$ 4 and 5

Approximate to the nearest whole number.

10. $\sqrt{2} \approx$ 1
11. $\sqrt{3} \approx$ 2
12. $\sqrt{7} \approx$ 3
13. $\sqrt{14} \approx$ 4
14. $\sqrt{55} \approx$ 7
15. $\sqrt{39} \approx$ 6
16. $\sqrt{99} \approx$ 10
17. $\sqrt{39} \approx$ 6
18. $\sqrt{24} \approx$ 5

Approximate to the nearest tenth.

19. $\sqrt{2} \approx$ 1.4
20. $\sqrt{3} \approx$ 1.7
21. $\sqrt{7} \approx$ 2.6
22. $\sqrt{14} \approx$ 3.7
23. $\sqrt{55} \approx$ 7.4
24. $\sqrt{39} \approx$ 6.2

Approximate to the nearest hundredth.

25. $\sqrt{2} \approx$ 1.41
26. $\sqrt{3} \approx$ 1.73
27. $\sqrt{7} \approx$ 2.65

Rational and Irrational Numbers—Skills Practice

Name: _____

Approximate expressions with irrational numbers. **Form A**

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

1. $2\sqrt{3}$ — 3 and 4
2. 2π — 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. $\sqrt{5} + \sqrt{2} \approx$ 4
8. $\pi^2 \approx$ 10
9. $\frac{\sqrt{82}}{4} \approx$ 2
10. $3\pi \approx$ 9
11. $(\sqrt{2})^3 \approx$ 3
12. $3\sqrt{24} \approx$ 15

Approximate the value of the expression to the nearest tenth.

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

Rational and Irrational Numbers—Skills Practice

Name: _____

Approximate expressions with irrational numbers. **Form B**

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

1. $2\sqrt{2}$ — 2 and 3
2. 4π — 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. $\sqrt{3} + \sqrt{2} \approx$ 3
8. $\pi^3 \approx$ 31
9. $\frac{\sqrt{65}}{3} \approx$ 3
10. $\frac{\pi}{3} \approx$ 1
11. $(\sqrt{3})^3 \approx$ 5
12. $4\sqrt{26} \approx$ 20

Approximate the value of the expression to the nearest tenth.

13. $\sqrt{5} - \sqrt{3} \approx$ 0.5
14. $\frac{\sqrt{3}}{2} \approx$ 0.9
15. $\frac{1}{\sqrt{2}} \approx$ 0.7
16. $5\pi \approx$ 15.7
17. $\frac{2}{\sqrt{3}} \approx$ 1.2
18. $6 - \pi \approx$ 2.9

Rational and Irrational Numbers—Skills Practice

Name: _____

Rewrite a repeating decimal as a fraction. **Form A**

1. $0.\overline{6} =$ $\frac{2}{3}$ or $\frac{6}{9}$
2. $0.\overline{63} =$ $\frac{7}{11}$ or $\frac{63}{99}$
3. $0.\overline{4} =$ $\frac{4}{9}$
4. $0.8\overline{3} =$ $\frac{5}{6}$ or $\frac{75}{90}$
5. $0.1\overline{3} =$ $\frac{2}{15}$ or $\frac{12}{90}$
6. $0.2\overline{7} =$ $\frac{5}{18}$ or $\frac{25}{90}$
7. $0.6\overline{1} =$ $\frac{11}{18}$ or $\frac{55}{90}$
8. $0.0\overline{6} =$ $\frac{1}{15}$ or $\frac{6}{90}$
9. $0.9\overline{4} =$ $\frac{17}{18}$ or $\frac{85}{90}$
10. $0.\overline{36} =$ $\frac{4}{11}$ or $\frac{36}{99}$
11. $0.\overline{7} =$ $\frac{7}{9}$
12. $0.\overline{54} =$ $\frac{6}{11}$ or $\frac{54}{99}$
13. $0.41\overline{6} =$ $\frac{5}{12}$ or $\frac{375}{900}$
14. $0.8\overline{6} =$ $\frac{13}{15}$ or $\frac{78}{90}$
15. $0.083\overline{3} =$ $\frac{1}{12}$ or $\frac{75}{900}$
16. $0.\overline{27} =$ $\frac{3}{11}$ or $\frac{27}{99}$
17. $0.\overline{1} =$ $\frac{1}{9}$
18. $0.\overline{90} =$ $\frac{10}{11}$ or $\frac{90}{99}$

Rational and Irrational Numbers—Skills Practice

Name: _____

Rewrite a repeating decimal as a fraction. **Form B**

1. $0.\overline{3} =$ $\frac{1}{3}$ or $\frac{3}{9}$
2. $0.\overline{81} =$ $\frac{9}{11}$ or $\frac{81}{99}$
3. $0.\overline{5} =$ $\frac{5}{9}$
4. $0.1\overline{6} =$ $\frac{1}{6}$ or $\frac{15}{90}$
5. $0.7\overline{3} =$ $\frac{11}{15}$ or $\frac{66}{90}$
6. $0.3\overline{8} =$ $\frac{7}{18}$ or $\frac{35}{90}$
7. $0.7\overline{2} =$ $\frac{13}{18}$ or $\frac{65}{90}$
8. $0.2\overline{6} =$ $\frac{4}{15}$ or $\frac{24}{90}$
9. $0.5\overline{3} =$ $\frac{8}{15}$ or $\frac{48}{90}$
10. $0.\overline{18} =$ $\frac{2}{11}$ or $\frac{18}{99}$
11. $0.\overline{2} =$ $\frac{2}{9}$
12. $0.\overline{45} =$ $\frac{5}{11}$ or $\frac{45}{99}$
13. $0.58\overline{3} =$ $\frac{7}{12}$ or $\frac{525}{900}$
14. $0.0\overline{5} =$ $\frac{1}{18}$ or $\frac{5}{90}$
15. $0.91\overline{6} =$ $\frac{11}{12}$ or $\frac{825}{900}$
16. $0.\overline{09} =$ $\frac{1}{11}$ or $\frac{9}{99}$
17. $0.\overline{8} =$ $\frac{8}{9}$
18. $0.\overline{72} =$ $\frac{8}{11}$ or $\frac{72}{99}$

Rational and Irrational Numbers—Repeated Reasoning

Name: _____

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

Set A

1. $0.\overline{3} =$ $\frac{3}{9}$ or $\frac{1}{3}$
2. $0.0\overline{3} =$ $\frac{3}{90}$ or $\frac{1}{30}$
3. $0.00\overline{3} =$ $\frac{3}{900}$ or $\frac{1}{300}$
4. $0.\overline{4} =$ $\frac{4}{9}$
5. $0.0\overline{4} =$ $\frac{4}{90}$ or $\frac{2}{45}$
6. $0.00\overline{4} =$ $\frac{4}{900}$ or $\frac{1}{225}$
7. $0.\overline{5} =$ $\frac{5}{9}$
8. $0.0\overline{5} =$ $\frac{5}{90}$ or $\frac{1}{18}$
9. $0.00\overline{5} =$ $\frac{5}{900}$ or $\frac{1}{180}$

Set B

1. $0.\overline{3} =$ $\frac{3}{9}$ or $\frac{1}{3}$
2. $0.0\overline{3} =$ $\frac{3}{99}$ or $\frac{1}{33}$
3. $0.00\overline{3} =$ $\frac{3}{999}$ or $\frac{1}{333}$
4. $0.\overline{4} =$ $\frac{4}{9}$
5. $0.0\overline{4} =$ $\frac{4}{99}$
6. $0.00\overline{4} =$ $\frac{4}{999}$
7. $0.\overline{5} =$ $\frac{5}{9}$
8. $0.0\overline{5} =$ $\frac{5}{99}$
9. $0.00\overline{5} =$ $\frac{5}{999}$

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. **Form A**

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. $\frac{m^3}{m^9} =$ $\frac{1}{m^6}$
5. $(n^9)^3 =$ n^{27}
6. $\frac{w^8}{w^4} =$ w^4

Evaluate each expression.

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

Integer Exponents—Skills Practice

Name: _____

Simplify more expressions with exponents. **Form A**

Rewrite each expression using a single exponent.

1. $y^{-3} \cdot y^{-7} =$ y^{-10} or $\frac{1}{y^{10}}$
2. $(m^{-2})^3 =$ m^{-6} or $\frac{1}{m^6}$
3. $n^{-2} \cdot n^8 =$ n^6
4. $\frac{m^{-10}}{m^{-5}} =$ m^{-5} or $\frac{1}{m^5}$
5. $(n^{-4})^{-4} =$ n^{16}
6. $\frac{w^6}{w^{-5}} =$ w^{11}

Evaluate each expression.

7. $2^{-4} \cdot 2^{-2} =$ $\frac{1}{64}$
8. $0^7 \cdot 2^7 =$ 0
9. $(2^{-3})^{-3} =$ 512
10. $(3^{-4})^0 =$ 1
11. $(-2)^{-2} \cdot (-2)^{-2} =$ $\frac{1}{16}$
12. $\frac{(-6)^3}{(-6)^2} =$ -6
13. $3^0 \cdot 3^{-4} =$ $\frac{1}{81}$
14. $\frac{7^{-2}}{3^{-2}} =$ $\frac{9}{49}$
15. $\frac{4^{-2}}{4^{-5}} =$ 64
16. $(-5)^4 \cdot (-5)^{-3} =$ -5
17. $\frac{(-8)^0}{(-7)^0} =$ 1
18. $\frac{(-4)^3}{(-6)^3} =$ $\frac{8}{27}$

Integer Exponents—Skills Practice

Name: _____

Simplify expressions with exponents. **Form B**

Rewrite each expression using a single nonnegative exponent.

1. $y^4 \cdot y^{11} =$ y^{15}
2. $(m^2)^7 =$ m^{14}
3. $n^8 \cdot n^5 =$ n^{13}
4. $\frac{m^2}{m^6} =$ $\frac{1}{m^4}$
5. $(n^8)^7 =$ n^{56}
6. $\frac{w^{10}}{w^5} =$ w^5

Evaluate each expression.

7. $5^2 \cdot 5^4 =$ $15{,}625$
8. $2^1 \cdot 6^1 =$ 12
9. $(2^2)^5 =$ $1{,}024$
10. $(3^2)^2 =$ 81
11. $4^2 \cdot 2^2 =$ 64
12. $\frac{3^6}{3^6} =$ 1
13. $2^2 \cdot 2^4 =$ 64
14. $\frac{10^3}{2^3} =$ 125
15. $\frac{2^5}{2^3} =$ 4
16. $4^3 \cdot 2^3 =$ 512
17. $\frac{4^2}{8^2} =$ $\frac{1}{4}$
18. $\frac{4^3}{4^2} =$ 4

Integer Exponents—Skills Practice

Name: _____

Simplify more expressions with exponents. **Form B**

Rewrite each expression using a single exponent.

1. $y^{-4} \cdot y^{-5} =$ y^{-9} or $\frac{1}{y^9}$
2. $(m^{-3})^5 =$ m^{-15} or $\frac{1}{m^{15}}$
3. $n^{-3} \cdot n^6 =$ n^3
4. $\frac{m^{-12}}{m^{-6}} =$ m^{-6} or $\frac{1}{m^6}$
5. $(n^{-2})^{-2} =$ n^4
6. $\frac{w^5}{w^{-7}} =$ w^{12}

Evaluate each expression.

7. $2^{-3} \cdot 2^{-2} =$ $\frac{1}{32}$
8. $(-6)^4 \cdot (-6)^{-3} =$ -6
9. $(4^{-6})^0 =$ 1
10. $(3^{-2})^{-2} =$ 81
11. $(-3)^{-2} \cdot (-4)^{-2} =$ $\frac{1}{144}$
12. $\frac{(-5)^4}{(-5)^3} =$ -5
13. $4^0 \cdot 4^{-3} =$ $\frac{1}{64}$
14. $\frac{8^{-2}}{3^{-2}} =$ $\frac{9}{64}$
15. $\frac{3^{-2}}{3^{-5}} =$ 27
16. $0^6 \cdot 2^6 =$ 0
17. $\frac{(-6)^3}{(3)^3} =$ -8
18. $\frac{(-6)^0}{(-5)^0} =$ 1

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

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

Name: _____

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

Set A

1. $3^2 \times 3^1 =$ 3^3
2. $3^{-2} \times 3^{-1} =$ 3^{-3}
3. $3^2 \times 3^2 =$ 3^4
4. $3^{-2} \times 3^{-2} =$ 3^{-4}
5. $3^2 \times 3^3 =$ 3^5
6. $3^{-2} \times 3^{-3} =$ 3^{-5}
7. $3^2 \times 3^4 =$ 3^6
8. $3^{-2} \times 3^{-4} =$ 3^{-6}
9. $3^2 \times 3^5 =$ 3^7
10. $3^{-2} \times 3^{-5} =$ 3^{-7}
11. $3^2 \times 3^6 =$ 3^8
12. $3^{-2} \times 3^{-6} =$ 3^{-8}

Set B

1. $3^{-2} \times 3^1 =$ 3^{-1}
2. $3^{-2} \times 3^2 =$ 3^0
3. $3^{-2} \times 3^3 =$ 3^1
4. $3^2 \times 3^{-1} =$ 3^1
5. $3^2 \times 3^{-2} =$ 3^0
6. $3^2 \times 3^{-3} =$ 3^{-1}

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.

Integer Exponents—Repeated Reasoning

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.

1. $2^5 \div 2^3 = (2 \cdot 2 \cdot 2 \cdot 2 \cdot 2) \div (2 \cdot 2 \cdot 2) = 2 \cdot 2 = 2^2$
2. $3^5 \div 3^3 =$ $(3 \cdot 3 \cdot 3 \cdot 3 \cdot 3) \div (3 \cdot 3 \cdot 3) = 3 \cdot 3 = 3^2$
3. $4^5 \div 4^3 =$ $(4 \cdot 4 \cdot 4 \cdot 4 \cdot 4) \div (4 \cdot 4 \cdot 4) = 4 \cdot 4 = 4^2$
4. $5^5 \div 5^3 =$ $(5 \cdot 5 \cdot 5 \cdot 5 \cdot 5) \div (5 \cdot 5 \cdot 5) = 5 \cdot 5 = 5^2$
5. $6^5 \div 6^3 =$ $(6 \cdot 6 \cdot 6 \cdot 6 \cdot 6) \div (6 \cdot 6 \cdot 6) = 6 \cdot 6 = 6^2$
6. $7^5 \div 7^3 =$ $(7 \cdot 7 \cdot 7 \cdot 7 \cdot 7) \div (7 \cdot 7 \cdot 7) = 7 \cdot 7 = 7^2$
7. $8^5 \div 8^3 =$ $(8 \cdot 8 \cdot 8 \cdot 8 \cdot 8) \div (8 \cdot 8 \cdot 8) = 8 \cdot 8 = 8^2$
8. $9^5 \div 9^3 =$ $(9 \cdot 9 \cdot 9 \cdot 9 \cdot 9) \div (9 \cdot 9 \cdot 9) = 9 \cdot 9 = 9^2$
9. $n^5 \div n^3 =$ $(n \cdot n \cdot n \cdot n \cdot n) \div (n \cdot n \cdot n) = n \cdot n = n^2$
10. $6.3^5 \div 6.3^3 =$ $(6.3 \cdot 6.3 \cdot 6.3 \cdot 6.3 \cdot 6.3) \div (6.3 \cdot 6.3 \cdot 6.3) = 6.3 \cdot 6.3 = 6.3^2$

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. 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.

Integer Exponents—Repeated Reasoning

Name: _____

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.

1. $2^4 \div 2^1 = (2 \times 2 \times 2 \times 2) \div (2) = 2 \times 2 \times 2 = 2^3$
2. $2^4 \div 2^2 =$ $(2 \times 2 \times 2 \times 2) \div (2 \times 2) = 2 \times 2 = 2^2$
3. $2^4 \div 2^3 =$ $(2 \times 2 \times 2 \times 2) \div (2 \times 2 \times 2) = 2 = 2^1$
4. $2^4 \div 2^4 =$ $(2 \times 2 \times 2 \times 2) \div (2 \times 2 \times 2 \times 2) = 1 = 2^0$
5. $2^4 \div 2^5 =$ $(2 \times 2 \times 2 \times 2) \div (2 \times 2 \times 2 \times 2 \times 2) = 1 \div 2 = 2^{-1}$
6. $2^4 \div 2^6 =$ $(2 \times 2 \times 2 \times 2) \div (2 \times 2 \times 2 \times 2 \times 2 \times 2) = 1 \div (2 \times 2) = 2^{-2}$
7. $2^4 \div 2^7 =$ $(2 \times 2 \times 2 \times 2) \div (2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2) = 1 \div (2 \times 2 \times 2) = 2^{-3}$
8. $4.3^5 \div 4.3^2 =$ $(4.3 \times 4.3 \times 4.3 \times 4.3 \times 4.3) \div (4.3 \times 4.3) = 4.3 \times 4.3 \times 4.3 = 4.3^3$

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.

Integer Exponents—Repeated Reasoning

Name: _____

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

Write the base as a product of two factors. Use the exponent to expand the product. Then write it as a product of two exponential expressions. The first one has been done for you.

Set B

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

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. **Form A**

1. 4,500 = 4.5×10^3
2. 0.0578 = 5.78×10^{-2}
3. 57 = 5.7×10^1
4. 0.006256 = 6.256×10^{-3}
5. 730 = 7.3×10^2
6. 0.000042 = 4.2×10^{-5}
7. 0.007 = 7.0×10^{-3}
8. 25.63 = 2.563×10^1
9. 300.25 = 3.0025×10^2
10. 0.1456 = 1.456×10^{-1}
11. 56,325.2 = 5.63252×10^4
12. 9,214.3 = 9.2143×10^3

Write the numbers in standard form.

13. 7.65×10^3 = 7,650
14. 5.21×10^{-1} = 0.521
15. 7.528×10^2 = 752.8
16. 2.169×10^{-4} = 0.0002169
17. 2.7345×10^1 = 27.345
18. 4.6×10^{-5} = 0.000046
19. 8.752×10^5 = 875,200
20. 5.0×10^{-3} = 0.005
21. 8.0×10^7 = 80,000,000
22. 5.639×10^{-2} = 0.05639
23. 5.3725×10^4 = 53,725
24. 1.3×10^{-6} = 0.0000013

Scientific Notation—Skills Practice

Name: _____

Write the numbers in scientific notation. **Form B**

1. 6,500 = 6.5×10^3
2. 0.0354 = 3.54×10^{-2}
3. 69 = 6.9×10^1
4. 0.007257 = 7.257×10^{-3}
5. 820 = 8.2×10^2
6. 0.000053 = 5.3×10^{-5}
7. 0.002 = 2.0×10^{-3}
8. 37.85 = 3.785×10^1
9. 400.75 = 4.0075×10^2
10. 0.2531 = 2.531×10^{-1}
11. 76,213.8 = 7.62138×10^4
12. 1,876.4 = 1.8764×10^3

Write the numbers in standard form.

13. 8.72×10^3 = 8,720
14. 3.79×10^{-1} = 0.379
15. 3.628×10^2 = 362.8
16. 9.786×10^{-4} = 0.0009786
17. 1.4278×10^1 = 14.278
18. 3.4×10^{-5} = 0.000034
19. 6.251×10^5 = 625,100
20. 4.0×10^{-3} = 0.004
21. 9.0×10^7 = 90,000,000
22. 6.213×10^{-2} = 0.06213
23. 4.1723×10^4 = 41,723
24. 4.6×10^{-6} = 0.0000046

Scientific Notation—Skills Practice

Name: _____

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. $(2.8 \times 10^5) \div (7 \times 10^{-2}) =$ 4,000,000
3. $(3.9 \times 10^6) + (4.1 \times 10^7) =$ 44,900,000
4. $(5.05 \times 10^{-3}) \div (5.05 \times 10^{-2}) =$ 0.1
5. $(3.21 \times 10^{-3}) \cdot (4.6 \times 10^3) =$ 14.766
6. $(4.5 \times 10^4) + (1.1 \times 10^1) =$ 45,011
7. $(2.65 \times 10^3) - (1.21 \times 10^3) =$ 1,440
8. $(7.5 \times 10^{-2}) + (8.6 \times 10^2) =$ 860.075
9. $(6.21 \times 10^{-2}) - (4.32 \times 10^{-4}) =$ 0.061668
10. $(8.6 \times 10^2) + (9.4 \times 10^2) =$ 1,800
11. $(2.6 \times 10^5) \cdot (3.8 \times 10^{-3}) =$ 988
12. $(1.7 \times 10^{-1}) + (2.59 \times 10^{-2}) =$ 0.1959
13. $\frac{4.62 \times 10^6}{2.2 \times 10^3} =$ 2,100
14. $(4.25 \times 10^5) \cdot (3.5 \times 10^{-5}) =$ 14.875

Scientific Notation—Skills Practice

Name: _____

Perform operations with numbers written in scientific notation. Write your answers in standard form. **Form B**

1. $(3.1 \times 10^4) \times (3 \times 10^3) =$ 93,000,000
2. $(3.6 \times 10^5) \div (4 \times 10^{-2}) =$ 9,000,000
3. $(2.7 \times 10^6) + (5.1 \times 10^7) =$ 53,700,000
4. $(6.39 \times 10^{-2}) \div (3 \times 10^{-3}) =$ 21.3
5. $(4.78 \times 10^{-3}) \times (2.1 \times 10^3) =$ 10.038
6. $(5.84 \times 10^4) + (6.2 \times 10^1) =$ 58,462
7. $(3.85 \times 10^3) - (1.41 \times 10^3) =$ 2,440
8. $(3.5 \times 10^{-2}) + (7.9 \times 10^2) =$ 790.035
9. $(5.31 \times 10^{-2}) - (2.34 \times 10^{-4}) =$ 0.052866
10. $(7.2 \times 10^2) + (8.7 \times 10^2) =$ 1,590
11. $(4.6 \times 10^5) \times (2.8 \times 10^{-3}) =$ 1,288
12. $(1.9 \times 10^{-1}) + (3.69 \times 10^{-2}) =$ 0.2269
13. $\frac{1.725 \times 10^6}{7.5 \times 10^3} =$ 230
14. $(4.87 \times 10^6) \times (4.3 \times 10^{-5}) =$ 209.41

Solutions to Linear Equations—Skills Practice

Name: _____

Solve and tell whether the equation has 1 solution, no solution, or infinitely many solutions. **Form A**

1. $-3x + 8 - 5x = 21 - 8x$
   no solution
2. $-2y - 7 + 5y = 13 - 2y$
   1 solution: $y = 4$
3. $12 - 8z = -20 - 4z$
   1 solution: $z = 8$
4. $7 + 2f = 9 + 4f$
   1 solution: $f = -1$
5. $6 + 3m - 4 = -5 + 3m + 7$
   infinitely many solutions
6. $d + 6 + 2d = 4d + 9$
   1 solution: $d = -3$
7. $4p - 4 = 3p - 3$
   1 solution: $x = 1$
8. $4c + 12 = c - 3$
   1 solution: $c = -5$
9. $7d - 8 = 3d - 8$
   1 solution: $d = 0$
10. $-9n - 8 = -10n - 7$
    1 solution: $n = 1$
11. $6 + 8b = -6 + 2b$
    1 solution: $b = -2$
12. $7g + 5 - 2g = 5 + 5g$
    infinitely many solutions

Solutions to Linear Equations—Skills Practice

Name: _____

Solve and tell whether the equation has 1 solution, no solution, or infinitely many solutions. **Form B**

1. $-3x - 8 + 5x = 17 - 3x$
   1 solution: $x = 5$
2. $-4a + 6 - 2a = 12 - 6a$
   no solution
3. $14 - 7z = -22 - 3z$
   1 solution: $z = 9$
4. $9 + 4g - 6 = -3 + 4g + 6$
   infinitely many solutions
5. $8 + 3d = 10 + 5d$
   1 solution: $d = -1$
6. $5w - 5 = 4w - 4$
   1 solution: $w = 1$
7. $c + 7 + 3c = 5c + 11$
   1 solution: $c = -4$
8. $9 + 6p = -9 - 3p$
   1 solution: $p = -2$
9. $5f + 14 = f - 6$
   1 solution: $f = -5$
10. $9h - 7 = 4h - 7$
    1 solution: $h = 0$
11. $6z + 3 - 3z = 3 + 3z$
    infinitely many solutions
12. $-9b - 10 = -10b - 9$
    1 solution: $b = 1$

Solutions to Linear Equations—Skills Practice

Name: _____

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

1. $6x - 12 = 6(x - 2)$
   infinitely many solutions
2. $\frac{4}{5} - \frac{3}{10}m = \frac{1}{10}m - \frac{4}{5}$
   1 solution: $m = 4$
3. $-15x - 4 + 6x = -4 - 9x$
   infinitely many solutions
4. $7(y - 6) = 7y + 42$
   no solution
5. $4(p + 5) = 6p + 20$
   1 solution: $p = 0$
6. $3m + 11 = \frac{1}{3}(9m + 33)$
   infinitely many solutions
7. $15y - 4 = 12y - 28$
   1 solution: $y = -8$
8. $-8 + 2n + 14 = 4n - 16$
   1 solution: $n = 11$
9. $-\frac{1}{2}(4a + 8) = -2a + 4$
   no solution
10. $3(m - 4) = 6m - 15$
    1 solution: $m = 1$
11. $8(2y + 5) = 9y + 12$
    1 solution: $y = -4$
12. $2n + 14 = 3n + 5$
    1 solution: $n = 9$

Solutions to Linear Equations—Skills Practice

Name: _____

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

1. $\frac{2}{3} - \frac{1}{6}m = \frac{1}{6}m - \frac{2}{3}$
   1 solution: $m = 4$
2. $7x - 14 = 7(x - 2)$
   infinitely many solutions
3. $7(p + 4) = 9p + 28$
   1 solution: $p = 0$
4. $-16x - 8 + 9x = -8 - 7x$
   infinitely many solutions
5. $4m + 11 = \frac{1}{8}(32m + 88)$
   infinitely many solutions
6. $8(y - 7) = 8y + 56$
   no solution
7. $-9 + 4n + 18 = 7n - 24$
   1 solution: $n = 11$
8. $14y - 6 = 11y - 27$
   1 solution: $y = -7$
9. $5(m - 3) = 7m - 17$
   1 solution: $m = 1$
10. $-\frac{1}{4}(8a + 20) = -2a + 5$
    no solution
11. $7(4y + 5) = 19y + 8$
    1 solution: $y = -3$
12. $-9n - 8 - 3n = 6n - 8$
    1 solution: $n = 0$

Systems of Equations—Skills Practice

Name: _____

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 $y = \frac{1}{3}x$
$-6x + 3y = 30$
$x = -6, y = -2$

9 $x = 1.5y$
$-8x - 2y = -84$
$x = 9, y = 6$

10 $y = 0.5x$
$8y - 6x = -20$
$x = 10, y = 5$

Systems of Equations—Skills Practice

Name: _____

Solve systems of equations using substitution. **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 $y = \frac{1}{5}x$
$-7x + 5y = 60$
$x = -10, y = -2$

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 $x + 7 = 8y$
$8y + x = 9$
$x = 1, y = 1$

Systems of Equations—Skills Practice

Name: _____

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. $9x - 6y = 3$
   $-9x + 4y = 7$
   $x = -3, y = -5$

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. $x + 4 = 6y$
    $6y + x = 8$
    $x = 2, y = 1$

Systems of Equations—Skills Practice

Name: _____

Solve systems of equations using any method. **Form B**

1. $20x - 10y = 50$
   $10x - 15y = -5$
   $x = 4, y = 3$

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. $8x - 4y = 4$
   $-8x + 2y = 6$
   $x = -2, y = -5$

6. $15y - 5x = 20$
   $x - 3y = -4$
   infinitely many solutions

7. $8x - 4y = 3$
   $-4y + 8x = 9$
   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. $x = -2y$
    $3y + 5x = -21$
    $x = -6, y = 3$

Systems of Equations—Skills Practice

Name: _____

Solve systems of equations involving fractions and decimals. **Form A**

1 $x = 0.5y$
$6x + 2y = 20$
$x = 2, y = 4$

2 $2x + 3y = 5$
$0.25x + 0.25y = 0.5$
$x = 1, y = 1$

3 $\frac{3}{5}x + \frac{7}{10}y = 20$
$2x - 7y = -120$
$x = 10, y = 20$

4 $x = \frac{1}{4}y$
$12x - 4y = 8$
$x = -2, y = -8$

5 $4x + 5y = 42$
$\frac{2}{3}x - \frac{1}{6}y = 1$
$x = 3, y = 6$

6 $-8x - 7y = 3$
$\frac{4}{5}x + \frac{7}{10}y = \frac{3}{10}$
no solution

7 $\frac{1}{8}x + \frac{1}{4}y = 2$
$x + 2y = 16$
infinitely many solutions

8 $x = \frac{1}{6}y$
$36x - 2y = 24$
$x = 1, y = 6$

9 $6x - 5y = 36$
$0.5x + 2.5y = 3$
$x = 6, y = 0$

10 $2.5x + 5y = 50$
$1.25x + 1.5y = 21$
$x = 12, y = 4$

Systems of Equations—Skills Practice

Name: _____

Solve systems of equations involving fractions and decimals. **Form B**

1 $x = -0.5y$
$8x + 6y = 12$
$x = -3, y = 6$

2 $-6x + 12y = 14$
$1.5x - 3y = -3.5$
infinitely many solutions

3 $4x - 7y = 32$
$0.5x + 3.5y = 4$
$x = 8, y = 0$

4 $2x + 6y = 8$
$0.25x + 0.25y = 0.5$
$x = 1, y = 1$

5 $\frac{4}{5}x + \frac{3}{10}y = 13$
$2x - 3y = -80$
$x = 5, y = 30$

6 $y = \frac{1}{5}x$
$3x - 25y = 20$
$x = -10, y = -2$

7 $\frac{1}{5}x + \frac{1}{10}y = 3$
$2x + y = 30$
infinitely many solutions

8 $4x + y = 12$
$\frac{1}{3}x - \frac{1}{6}y = -2$
$x = 0, y = 12$

9 $-6x - 3y = 5$
$\frac{3}{4}x + \frac{3}{8}y = \frac{5}{8}$
no solution

10 $2x + 5y = 24$
$\frac{1}{2}x - \frac{3}{4}y = -2$
$x = 2, y = 4$

Linear Functions—Skills Practice

Name: _____

Find the slope of the line through two given points. **Form A**

1. (7, 7) and (9, 9) — slope = 1
2. (8, 11) and (5, 5) — slope = 2
3. (2, 5) and (5, 8) — slope = 1
4. (−2, −3) and (−1, −6) — slope = −3
5. (−1, −4) and (3, 12) — slope = 4
6. (0, 0) and (6, 5) — slope = $\frac{5}{6}$
7. (5, 6) and (9, 8) — slope = $\frac{1}{2}$
8. (−2, −13) and (−4, −3) — slope = −5
9. (5, 9) and (3, 11) — slope = −1
10. (−8, 17) and (−5, 19) — slope = $\frac{2}{3}$
11. $\left(\frac{1}{4}, 4\right)$ and $\left(\frac{3}{4}, 5\right)$ — slope = 2
12. (6, 3) and (−6, 6) — slope = $-\frac{1}{4}$
13. (8, 5) and (4, −7) — slope = 3
14. $\left(\frac{1}{8}, -2\right)$ and $\left(\frac{5}{8}, -4\right)$ — slope = −4
15. (0, 4) and (−10, 0) — slope = $\frac{2}{5}$
16. (3, 8) and (4, 6) — slope = −2
17. (4, 9) and (7, 9) — slope = 0
18. (−3, 0) and (0, 9) — slope = 3
19. (−2, 3) and (4, −2) — slope = $-\frac{5}{6}$
20. (1, 1) and (−3, 9) — slope = −2
21. $\left(-\frac{1}{4}, \frac{1}{4}\right)$ and (−2, 2) — slope = −1

Linear Functions—Skills Practice

Name: _____

Find the slope of the line through two given points. **Form B**

1. (7, 10) and (4, 4) — slope = 2
2. (6, 6) and (14, 14) — slope = 1
3. (−3, −4) and (−2, −7) — slope = −3
4. (0, 0) and (9, 4) — slope = $\frac{4}{9}$
5. (−1, −10) and (4, 15) — slope = 5
6. (2, 4) and (4, 6) — slope = 1
7. $\left(\frac{1}{4}, -3\right)$ and $\left(\frac{3}{4}, -5\right)$ — slope = −4
8. $\left(-\frac{1}{5}, \frac{1}{5}\right)$ and (−2, 2) — slope = −1
9. (2, 7) and (6, 9) — slope = $\frac{1}{2}$
10. (−2, −5) and (−4, −11) — slope = 3
11. (−7, 16) and (−4, 18) — slope = $\frac{2}{3}$
12. (9, 6) and (−9, 9) — slope = $-\frac{1}{6}$
13. $\left(\frac{1}{8}, 6\right)$ and $\left(\frac{5}{8}, 7\right)$ — slope = 2
14. (1, 1) and (−2, 7) — slope = −2
15. (−2, 0) and (0, −10) — slope = −5
16. (0, −6) and (−8, 0) — slope = $-\frac{3}{4}$
17. (4, 12) and (5, 10) — slope = −2
18. (6, 7) and (1, 12) — slope = −1
19. (9, 6) and (4, −9) — slope = 3
20. (2, −1) and (7, 2) — slope = $\frac{3}{5}$
21. (6, 8) and (9, 8) — slope = 0

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 = $-\frac{1}{2}$
   Initial value = 9

4. (4, 8) and (12, 10)
   Rate of change = $\frac{1}{4}$
   Initial value = 7

5. (3, 13) and (6, 14)
   Rate of change = $\frac{1}{3}$
   Initial value = 12

6. (0, 4) and (7, 4)
   Rate of change = 0
   Initial value = 4

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

8. (3, 8) and (12, 2)
   Rate of change = $-\frac{2}{3}$
   Initial value = 10

9. (4, 1) and (8, 2)
   Rate of change = $\frac{1}{4}$
   Initial value = 0

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

11. (2, 8) and (4, 8)
    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 = $7
    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 = 7

Linear Functions—Skills Practice

Name: _____

Determine the rate of change and the initial value of the line through two given points. **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 = $\frac{1}{5}$
   Initial value = 0

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

5. (1, 6) and (6, 16)
   Rate of change = 2
   Initial value = 4

6. (8, 30) and (5, 21)
   Rate of change = 3
   Initial value = 6

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

8. (4, 7) and (12, 9)
   Rate of change = $\frac{1}{4}$
   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 = $-\frac{1}{2}$
    Initial value = 8

11. (6, 16) and (9, 17)
    Rate of change = $\frac{1}{3}$
    Initial value = 14

12. (6, 8) and (15, 2)
    Rate of change = $-\frac{2}{3}$
    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 = $6
    Initial value = $14

14. Addison has some puzzle books. She will buy 7 new puzzle of 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: _____

Identify another point on the line given one point and the slope. **Form A**

One possible answer is given.

1. (−4, 0) and slope = −2 — **(−3, −2)**
2. (−5, 2) and slope = −1 — **(−4, 1)**
3. (4, 5) and slope = 0 — **(5, 5)**
4. (−3, −2) and slope = 5 — **(−2, 3)**
5. (5, 6) and slope = 1 — **(6, 7)**
6. (0, 0) and slope = 3 — **(1, 3)**
7. (−1, −1) and slope = $-\frac{1}{2}$ — **(1, −2)**
8. (1, 1) and slope = −4 — **(2, −3)**
9. (−2, −2) and slope = $\frac{1}{4}$ — **(2, −1)**
10. (0, −2) and slope = −5 — **(1, −7)**
11. (1, 2) and slope = $-\frac{1}{3}$ — **(4, 1)**
12. (3, −6) and slope = 4 — **(4, −2)**
13. (2, −3) and slope = 0 — **(3, −3)**
14. (4, 4) and slope = −3 — **(5, 1)**
15. (3, 5) and slope = $-\frac{3}{5}$ — **(8, 2)**
16. (2, 7) and slope = 1 — **(3, 8)**
17. (3, −3) and slope = −6 — **(4, −9)**
18. (2, 2) and slope = 2 — **(3, 4)**
19. (−2, 1) and slope = $\frac{1}{6}$ — **(4, 2)**
20. (4, 2) and slope = −2 — **(5, 0)**
21. (0, 0) and slope = $\frac{2}{3}$ — **(3, 2)**
22. (2, 4) and slope = −1 — **(3, 3)**
23. (1, −1) and slope = 3 — **(2, 2)**
24. (−1, 1) and slope = 8 — **(0, 9)**

Linear Functions—Skills Practice

Name: _____

Identify another point on the line given one point and the slope. **Form B**

One possible answer is given.

1. (6, 7) and slope = 0 — **(7, 7)**
2. (−4, −5) and slope = 5 — **(−3, 0)**
3. (−4, 3) and slope = −1 — **(−3, 2)**
4. (−6, 0) and slope = −2 — **(−5, −2)**
5. (3, 11) and slope = 1 — **(4, 12)**
6. (0, 0) and slope = $\frac{1}{4}$ — **(4, 1)**
7. (−1, −1) and slope = $-\frac{3}{5}$ — **(4, −4)**
8. (1, 2) and slope = $-\frac{1}{2}$ — **(3, 1)**
9. (0, −3) and slope = −5 — **(1, −8)**
10. (4, −8) and slope = 3 — **(5, −5)**
11. (4, −9) and slope = 0 — **(5, −9)**
12. (−3, 3) and slope = $-\frac{1}{3}$ — **(0, 2)**
13. (5, 5) and slope = −2 — **(6, 3)**
14. (5, −5) and slope = −6 — **(6, −11)**
15. (8, 9) and slope = 1 — **(9, 10)**
16. (−2, 3) and slope = $\frac{2}{3}$ — **(1, 5)**
17. (3, 4) and slope = −4 — **(4, 0)**
18. (−3, 1) and slope = $\frac{1}{6}$ — **(3, 2)**
19. (1, 1) and slope = −3 — **(2, −2)**
20. (0, 0) and slope = 4 — **(1, 4)**
21. (−1, 1) and slope = 2 — **(0, 3)**
22. (8, 8) and slope = 8 — **(9, 16)**
23. (1, −1) and slope = −1 — **(2, −2)**
24. (6, 2) and slope = 3 — **(7, 5)**