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LESSON 1.2

Practice

For use with pages 10–17

Write the expression using exponents.

1. $a \cdot a \cdot a$

a^3

2. $(-7) \cdot (-7) \cdot (-7) \cdot (-7)$

$(-7)^4$

3. $(-x)(-x)(-x)(-x)(-x)$

$(-x)^5$

4. $(2x \cdot 2x \cdot 2x) + 5$

$(2x)^3 + 5$

5. $(3a \cdot 3a) - (b \cdot b \cdot b \cdot b)$

$(3a)^2 - b^4$

6. 2 to the nth power

2^n

Evaluate the expression.

7. $(-4)^2$

16

8. -2^4

-16

9. $3 - (4 - 2) \cdot 5$

$3 - 2 \cdot 5$
$3 - 10$
-7

10. $1 + (5^2 - 10) \div 5$

$1 + (25 - 10) \div 5$
$1 + 15 \div 5$
$1 + 3 = 4$

11. $(6 - 5)^3 + 14 \div (2 + 5)$

$1^3 + 14 \div 7$
$1 + 2$
3

12. $24 - (1 + 1)^4 \div 4$

$24 - 2^4 \div 4$
$24 - 16 \div 4$
$24 - 4$
$= 20$

Evaluate the expression for the given value of x.

13. $x(x - 3)$ when $x = 7$

$7(7 - 3)$
$7(4)$
28

14. $3x - 0.5(x - 2x)$ when $x = 4$

$3(4) - .5(4 - 2(4))$
$12 - .5(4 - 8)$
$12 - .5(-4) = 12 + 2 = 14$

15. $3x^2 - 2x$ when $x = -2$

$3(-2)^2 - 2(-2)$
$3(4) + 4$
$12 + 4$
16

16. $2x^2 \div (4 - 2x) + 2$ when $x = 4$

$2(4)^2 \div (4 - 2(4)) + 2$
$2(16) \div (4 - 8) + 2$
$32 \div (-4) + 2$
$-8 + 2 = -6$

17. $35 - \frac{2}{3}x^2 \div x$ when $x = 9$

$35 - \frac{2}{3}(9)^2 \div 9$
$35 - \frac{2}{3}(81) \div 9$
$35 - 2(27) \div 9$
$35 - 54 \div 9 = 35 - 6 = 29$

18. $7 - x^3\left(\frac{1}{2x}\right)$ when $x = -2$

$7 - (-2)^3\left(\frac{1}{2(-2)}\right)$
$7 - (-8)\left(\frac{1}{-4}\right)$
$7 - (2)$
5

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LESSON 1.2 **Practice** *continued*
For use with pages 10–17

Evaluate the expression for the given values of x and y.

19. $x^2 + 2y^2$ when $x = 3, y = 2$

$3^2 + 2(2)^2$
$9 + 2(4)$
$9 + 8 = \boxed{17}$

20. $-3x^2 + (3y)^4$ when $x = -5, y = 1$

$-3(-5)^2 + (3 \cdot 1)^4$
$-3(25) + 3^4$
$-75 + 81$
$\boxed{6}$

21. $\frac{3x + y - 1}{2x - y}$ when $x = 3, y = 4$

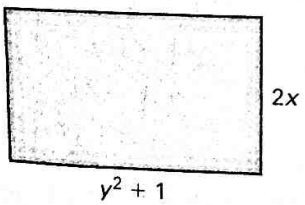
$\frac{3 \cdot 3 + 4 - 1}{2 \cdot 3 - 4} = \frac{9 + 4 - 1}{6 - 4}$
$= \frac{13 - 1}{2} = \frac{12}{2} = \boxed{6}$

22. $\frac{(2x - 2)^3}{-y^3 - 3}$ when $x = 2, y = -2$

$\frac{(2(2) - 2)^3}{-(-2)^3 - 3} = \frac{(4 - 2)^3}{-(-8) - 3} = \frac{2^3}{8 - 3} = \boxed{\frac{8}{5}}$

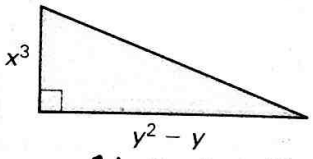
Write an expression for the area of the figure. Evaluate the expression for the given values of the variables.

23. $x = 3, y = 3$



$A = 2x(y^2 + 1)$
$A = 2(3)(3^2 + 1) = 6(9 + 1)$
$= 6(10) = \boxed{60}$

24. $x = 2, y = 5$



$x^3(y^2 - y) \div 2$
$2^3(5^2 - 5) \div 2$
$8(25 - 5) \div 2 = \frac{8(20)}{2} = \boxed{80}$

25. Photography Studio A photography studio advertises a session with a sitting fee of \$8.95 per person. The standard package of pictures costs \$29.95. Write an expression that gives the total cost of a session plus the purchase of one standard package. Evaluate the expression if a family of four purchases this package.

$8.95p + 29.99 \rightarrow 8.95(4) + 29.99$
$= \$65.79$

26. Books You want to buy either a paperback or hard covered book as a gift for five friends. Paperbacks cost \$6.95 each and hard covered books cost \$24.99 each. Write and simplify an expression for the total amount you spend if x of the books are paperback. Evaluate the expression if three of your friends get a paperback.

$6.95p + 24.99h$
$6.95(3) + 24.99(2) = \$70.83$

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Lesson 1.3

① $x - 9 = 12$
$+9 \quad +9$
$\boxed{x = 21}$

② $3x - 2 = 16$
$+2 \quad +2$
$\frac{3x}{3} = \frac{18}{3}$
$\boxed{x = 6}$

③ $3 - x = 2$
$-3 \quad -3$
$-x = -1$
$\boxed{x = 1}$

④ $-4 = x - 1$
$+1 \quad +1$
$\boxed{-3 = x}$

⑤ $3 = 2 + x$
$-2 \quad -2$
$\boxed{1 = x}$

⑥ $-14 + 2x = 6$
$+14 \quad +14$
$\frac{2x}{2} = \frac{20}{2}$
$\boxed{x = 10}$

⑦ $\frac{6x}{6} = \frac{24}{6}$
$x = 4$

⑧ $\frac{-4x}{-4} = \frac{-14}{-4}$
$x = \frac{7}{2}$

⑨ $\frac{3}{2}x + 1 = 13$
$-1 \quad -1$
$\frac{3}{2}x = 12$
$\frac{2}{3}\left(\frac{3}{2}x\right) = 12\left(\frac{2}{3}\right)$
$\boxed{x = \frac{24}{3} = 8}$

⑩ $\frac{2}{5}x + 10 = 0$
$-10 \quad -10$
$\frac{5}{2}\left(\frac{2}{5}x\right) = (-10)\frac{5}{2}$
$x = \frac{-50}{2}$
$\boxed{x = -25}$

⑪ $\frac{4}{3}x + 2 = 6$
$-2 \quad -2$
$\frac{3}{4}\left(\frac{4}{3}x\right) = (4)\frac{3}{4}$
$x = \frac{12}{4}$
$\boxed{x = 3}$

⑫ $x + 6 = 3(5 - x)$
$x + 6 = 15 - 3x$
$+3x \qquad +3x$
$4x + 6 = 15$
$-6 \quad -6$
$\frac{4x}{4} = \frac{9}{4}$
$\boxed{x = 9/4}$

⑬

(13) $x+\frac{3}{2}=\frac{3}{4}(x-\frac{1}{2})$

$x+\frac{3}{2}=\frac{3}{4}x-\frac{3}{8}$

$-\frac{3}{4}x \quad -\frac{3}{4}x$

$\frac{1}{4}x+\frac{3}{2}=-\frac{3}{8}$

$-\frac{3}{2} \quad -\frac{3}{2}$

$4\left(\frac{1}{4}x\right)=\left(\frac{-15}{8}\right)4 \rightarrow \boxed{x=\frac{-15}{2}}$

(14) $3(x-2)=2(2x-3)$

$3x-6=4x-6$

$-3x \quad -3x$

$-6=x-6$

$+6 \quad +6$

$\boxed{0=x}$

(15) $x+3/5=\frac{7}{5}(x+1)$

$x+3/5=\frac{7}{5}x+\frac{7}{5}$

$-x \quad -x$

$3/5=\frac{2}{5}x+\frac{7}{5}$

$-7/5 \quad -\frac{7}{5}$

$\frac{5}{2}\left(-\frac{4}{5}\right)=\left(\frac{2}{5}x\right)\frac{5}{2}$

$\boxed{-2=x}$

(16) $\frac{1}{2}(14x+2)=3(2-3x)$

$7x+1=6-9x$

$+9x \quad +9x$

$16x+1=6$

$-1 \quad -1$

$\frac{16x}{16}=\frac{5}{16}$

$\boxed{x=\frac{5}{16}}$

(17) $5x=\frac{4}{5}(5x-2)$

$5x=\frac{20}{5}x-\frac{8}{5}$

$5x=4x-\frac{8}{5}$

$-4x \quad -4x$

$\boxed{x=-8/5}$

(18) $x+6=3(3-x)$

$x+6=9-3x$

$+3x \quad +3x$

$4x+6=9$

$-6 \quad -6$

$\frac{4x}{4}=\frac{3}{4}$

$\boxed{x=3/4}$

(19) $\frac{5}{4}(4x+2)=3$

$\frac{20}{4}x+\frac{10}{4}=3$

$5x+\frac{5}{2}=3$

$-\frac{5}{2} \quad -\frac{5}{2}$

$5x=\frac{3\cdot2}{1\cdot2}-\frac{5}{2}$

$5x=\frac{6}{2}-\frac{5}{2}$

$\frac{5x}{5}=\frac{\frac{1}{2}}{5}$

$\boxed{x=\frac{1}{10}}$

(20) $27-2x=2(x+1)$

$27-2x=2x+2$

$+2x \quad +2x$

$27=4x+2$

$-2 \quad -2$

$\frac{25}{4}=\frac{4x}{4}$

$\boxed{\frac{25}{4}=x}$

(21) $x+4=2x-8\left(\frac{1}{4}x-\frac{1}{4}\right)$

$x+4=2x-\frac{8}{4}x+\frac{8}{4}$

$x+4=2x-2x+\frac{8}{4}$

$x+4=2$

$-4 \quad -4$

$\boxed{x=-2}$

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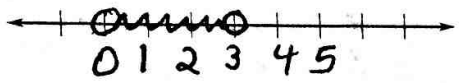
LESSON 1.6

Practice

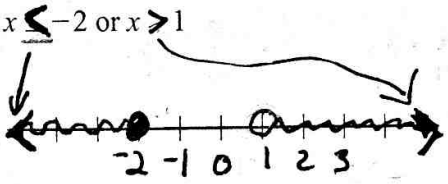
For use with pages 41–47

Graph the solution of the inequality.

1. $0 < x < 3$



2. $x \leq -2$ or $x \geq 1$



Solve the inequality.

3. $x - 5 > 9$
$+5 \quad +5$
$x > 14$

4. $\frac{4x}{4} \leq \frac{48}{4}$
$x \leq 12$

5. $-3 < 7 + 2x$
$-7 \quad -7$
$\frac{-10}{2} < \frac{2x}{2}$
$-5 < x$

6. $3x \leq 8 + x$
$-x \quad -x$
$\frac{2x}{2} \leq \frac{8}{2}$
$x \leq 4$

7. $7x + 3 > 10$
$-3 \quad -3$
$\frac{7x}{7} > \frac{7}{7}$
$x > 1$

8. $\frac{1}{4}x - 2 < -1$
$+2 \quad +2$
$4\left(\frac{1}{4}x\right) < (1)4$
$x < 4$

9. $-x + 4 \geq -2$
$-4 \quad -4$
$\frac{-x}{-1} \geq \frac{-6}{-1}$
$x \leq 6$

10. $5 - 5x \leq 10$
$-5 \quad -5$
$\frac{-5x}{-5} \leq \frac{5}{-5}$
$x \geq -1$

11. $-3x + 7 < -8$
$-7 \quad -7$
$\frac{-3x}{-3} < \frac{-15}{-3}$
$x > 5$

12. $4 < 3 - x$
$-3 \quad -3$
$\frac{1}{-1} < \frac{-x}{-1}$
$-1 > x$

13. $-3x + 6 \leq 6$
$-6 \quad -6$
$\frac{-3x}{-3} \leq \frac{0}{-3}$
$x \geq 0$

14. $x + 8 \leq 2x - 2$
$-x \quad -x$
$8 \leq x - 2$
$+2 \quad +2$
$10 \leq x$

15. $-3 < x - 3 < 0$
$+3 \quad +3 \quad +3$
$0 < x < 3$

16. $2 \leq x + 3 \leq 5$
$-3 \quad -3 \quad -3$
$-1 \leq x \leq 2$

17. $x + 2 \leq -1$ or $x - 2 \geq 1$
$-2 \quad -2 \qquad +2 \quad +2$
$x \leq -3 \qquad x \geq 3$

18. $x - 3 < -4$ or $x - 1 > 5$
$+3 \quad +3 \qquad +1 \quad +1$
$x < -1 \qquad x > 6$

19. $3 \leq \frac{1}{3}x - 2 \leq 4$
$+2 \quad +2 \quad +2$
$3(5) \leq \left(\frac{1}{3}x\right)3 \leq (6)3$
$15 \leq x \leq 18$

20. $2(x + 3) > -4$
$2x + 6 > -4$
$-6 \quad -6$
$\frac{2x}{2} > \frac{-10}{2}$
$x > -5$

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LESSON 1.6 **Practice** *continued*
For use with pages 41–47

Solve the inequality and then graph the solution.

21. $2 - x > 3x + 10$

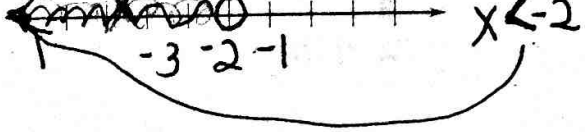
$+x \quad +x$

$2 > 4x + 10$

$-10 \quad -10$

$\frac{-8}{4} > \frac{4x}{4}$ → $-2 > x$

$x < -2$

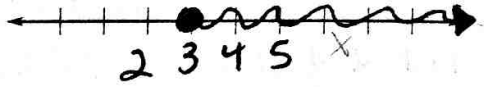


22. $3(x + 2) \geq 15$

$3x + 6 \geq 15$

$-6 \quad -6$

$\frac{3x}{3} \geq \frac{9}{3}$ → $x \geq 3$



23. Population of Hawaii From 2000 to 2003, Hawaii's population grew approximately by 3.8% from 1,211,537 to 1,257,608. Write an inequality that represents the number of people living in Hawaii during this time period.

$1{,}211{,}537 \leq x \leq 1{,}257{,}608$

24. NBA The all time leading scorer in NBA history is Kareem Abdul-Jabbar with 38,387 points. The tenth player on this list is John Havlicek with 26,395 points. Write an inequality that represents the range of points scored by the top ten all time leading scorers in NBA history.

$38387 > x > 26395$

$26395 \leq x \leq 38387$

25. Speed Limit On some sections of the German Autobahn there are no speed limits. Write an inequality that represents the various distances that you could travel in 2.5 hours if your maximum speed was 135 miles per hour during this time period. Solve the inequality.

$0 \leq x \leq 337.5$

26. Exam Grades The grades for a course are based on 5 exams and 1 final exam. All six of these tests are worth 100 points. To receive an A in the course, you must earn at least 552 points. Your grades on the 5 exams are as follows: 88, 96, 93, 91, and 89. Write an inequality that represents the various grades you can earn on the final exam and still get an A. Solve the inequality.

$88 + 96 + 93 + 91 + 89 + x \geq 552$

$457 + x \geq 552$

$-457 \quad -457$

$x \geq 95$

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LESSON 1.7

Practice

For use with pages 50–58

1-15

Decide whether the number is a solution of the equation.

1. $|2x + 3| = 7; 2$ — yes

2. $|3x - 5| = 2; -1$ — No

3. $|2x - 7| = 3; 2$ — yes

4. $|4 - 3x| = 10; 2$ — No

5. $\left|\frac{1}{3}x + 3\right| = 6; -9$

$\left|\frac{1}{3}(-9) + 3\right| = 6$

$|-3 + 3| = 6$

$|0| \neq 6$ No

6. $\left|2 - \frac{1}{2}x\right| = 5; -6$

$\left|2 - \frac{1}{2}(-6)\right| = 5$

$|2 + 3| = 5$

$|5| \stackrel{\checkmark}{=} 5$ yes

Solve the equation.

7. $|x - 3| = 5$

$x - 3 = 5$ $\quad +3 \quad +3$

$x = 8$

$x - 3 = -5$ $\quad +3 \quad +3$

$x = -2$

8. $|2x + 6| = 12$

$2x + 6 = 12$ $\quad -6 \quad -6$

$\frac{2x}{2} = \frac{6}{2}$

$x = 3$

$2x + 6 = -12$ $\quad -6 \quad -6$

$\frac{2x}{2} = \frac{-18}{2}$

$x = -9$

9. $|3x - 3| = 8$

$3x - 3 = 8$ $\quad +3 \quad +3$

$\frac{3x}{3} = \frac{11}{3}$

$x = \frac{11}{3}$

$3x - 3 = -8$ $\quad +3 \quad +3$

$\frac{3x}{3} = \frac{-5}{3}$

$x = \frac{-5}{3}$

10. $|1 - 2x| = 9$

$1 - 2x = 9$ $\quad -1 \quad -1$

$\frac{-2x}{-2} = \frac{8}{-2}$

$x = -4$

$1 - 2x = -9$ $\quad -1 \quad -1$

$\frac{-2x}{-2} = \frac{-10}{-2}$

$x = 5$

11. $\left|\frac{2}{3}x + 2\right| = 0$

$\frac{2}{3}x + 2 = 0$ $\quad -2 \quad -2$

$\frac{3}{2}\left(\frac{2}{3}x\right) = (-2)\frac{3}{2}$

$x = -3$

12. $|9x - 2| = 7$

$9x - 2 = 7$ $\quad +2 \quad +2$

$\frac{9x}{9} = \frac{9}{9}$

$x = 1$

$9x - 2 = -7$ $\quad +2 \quad +2$

$\frac{9x}{9} = \frac{-5}{9}$

$x = \frac{-5}{9}$

13. $|2x - 3| = 3$

$2x - 3 = 3$ $\quad +3 \quad +3$

$\frac{2x}{2} = \frac{6}{2}$

$x = 3$

$2x - 3 = -3$ $\quad +3 \quad +3$

$\frac{2x}{2} = \frac{0}{2}$

$x = 0$

14. $\left|1 - \frac{1}{5}x\right| = 3$

$1 - \frac{1}{5}x = 3$ $\quad -1 \quad -1$

$-5\left(-\frac{1}{5}x\right) = (2)(-5)$

$x = -10$

$1 - \frac{1}{5}x = -3$ $\quad -1 \quad -1$

$\left(-\frac{1}{5}x\right) \stackrel{-5}{=} (-4)(-5)$

$x = 20$

15. $|5 - 6x| = 7$

$5 - 6x = 7$ $\quad -5 \quad -5$

$\frac{-6x}{-6} = \frac{2}{-6}$

$x = -\frac{1}{3}$

$5 - 6x = -7$ $\quad -5 \quad -5$

$\frac{-6x}{-6} = \frac{-12}{-6}$

$x = 2$

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