SECTION 10

Statistics

Day 1

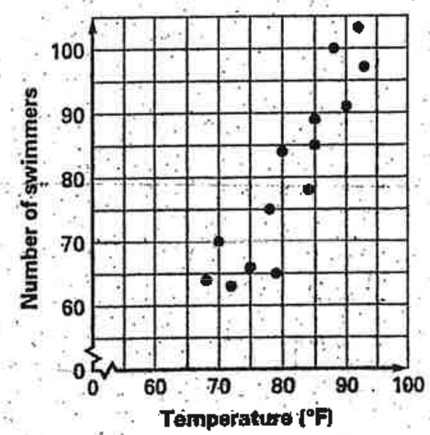
Lesson 10: Scatter Plots

A **scatter plot** is a way to represent data on a coordinate plane. Each point represents one pair of data. The scatter plot may be used to make a conclusion about the data sets.

EXAMPLE The manager of an outdoor swimming pool recorded data at 2:00 P.M. each day for two weeks in July. He was interested in the relationship between the temperature and the number of swimmers. Use a scatter plot to display the data. Then make a conclusion about the data.

[redacted]

Temperature (°F)	Number of Swimmers
75	66
78	75
80	84
85	85
85	89
72	63
68	64
70	70
79	65
84	77
88	100
93	97
92	103
90	91

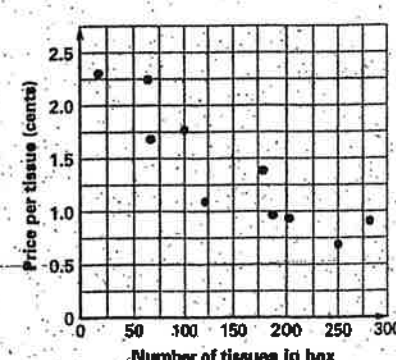


Conclusion:
The data show a *positive* relationship between the temperature and the number of swimmers. As the temperature increases, the number of swimmers increases.

Practice: First Try

Use the scatter plot at the right.

1. The data show a *negative* relationship between the number of tissues in a box and the ______________________.
2. As the number of tissues in a box increases, the price per tissue ______________________.
3. Based on this data, how can you save money when buying tissues?



Name ____________________ Date ____________________

Practice: Second Try

1. The table gives Anna's hours worked and money earned babysitting. Use a scatter plot to display the data. Then tell whether the data show a *positive relationship*, a *negative relationship*, or *no relationship*.

Hours Worked	Money Earned ($)
3	16
5	24
2.5	12
2	10
4	18
4.5	22
3.5	18
3	14
7	28
1.5	8
1	6
4	20
6	25
2.5	10

____________________ relationship

10. STATISTICS
10. Scatter Plots

Extend Your Skills

Tell whether you think the data described would show a *positive relationship*, a *negative relationship*, or *no relationship*.

2. The length and weight of a snake

3. The shoe size of a student and the student's test score

4. The age of a child and the number of years before the child's high school graduation

Puzzle

Use 5 letters from *scatter plot* to name a characteristic of a line.

____ ____ ____ ____ ____

Name ____________________ Date ____________

SECTION 6

Algebra Concepts

Day 2

Lesson 4: Perfect Squares and Square Roots

A **perfect square** is the square of an integer. The **square root** of a perfect square is an integer. The table shows how some perfect squares and square roots are related.

Perfect Squares	2^2 $= 2 \times 2$ $= 4$	3^2 $= 3 \times 3$ $= 9$	4^2 $= 4 \times 4$ $= 16$	5^2 $= 5 \times 5$ $= 25$
Square Roots	$\sqrt{4} = 2$	$\sqrt{9} = 3$	$\sqrt{16} = 4$	$\sqrt{25} = 5$

EXAMPLE 1 Find the two square roots of 9.

The number 9 has a positive square root and a negative square root.

Find a positive number you can square to get 9.

$3^2 = 3 \times 3 = 9$

Find a negative number you can square to get 9.

$(-3)^2 = (-3) \times (-3) = 9$

So, the two square roots of 9 are 3 and -3.

EXAMPLE 2 Evaluate $\sqrt{144}$.

The symbol $\sqrt{\ }$ is called a radical sign. It is used to represent the positive square root.

Find a positive number you can square to get 144.

$12^2 = 12 \times 12 = 144$

Since $12^2 = 144$, $\sqrt{144} = 12$.

Practice: First Try

Tell whether the number is a perfect square or not. Write *yes* or *no*.

1. 36 **2.** 48 **3.** 50 **4.** 64

5. 72 **6.** 81 **7.** 100 **8.** 125

Name _

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6. ALGEBRA CONCEPTS
4. Squares and Square Roots

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Ⓖ

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Ⓑ 8

12. Which
Ⓕ 1
Ⓖ 14

13. Find th
$\frac{1}{2}$ ton =
Ⓐ 10
Ⓑ 80

Remediation

Name ______________________ Date ______________

Practice: Second Try

Find the two square roots of the number.

1. 4
2. 64
3. 100
4. 169
5. 196
6. 900
7. 3600
8. 625

Evaluate the square root.

9. $\sqrt{25}$
10. $\sqrt{81}$
11. $\sqrt{49}$
12. $\sqrt{16}$
13. $\sqrt{36}$
14. $\sqrt{9}$
15. $\sqrt{144}$
16. $\sqrt{1}$
17. $\sqrt{400}$
18. $\sqrt{121}$
19. $\sqrt{225}$
20. $\sqrt{10{,}000}$

Extend Your Skills

Between which two consecutive integers does the square root lie. Explain.

21. $\sqrt{10}$
22. $\sqrt{65}$
23. $\sqrt{5}$
24. $\sqrt{40}$

25. Complete the table. What type of numbers are the areas?

Square	1 in.	2 in.	3 in.	4 in.	5 in.
Side Length (in.)					
Area (in.^{2})					

Puzzle

Which number does not belong?

36	124	9	225	16	49	1	4

Explain.

Name ______________________ Date ______________

SECTION 8

Polynomials and Rational Expressions

Day 3

Lesson 1: Properties of Exponents

A repeated multiplication can be represented by a **power**. Here are the properties to simplify expressions with powers.

Property	Algebra
Product of Powers: To multiply powers having the same base, add the exponents.	$a^m \cdot a^n = a^{m+n}, a \neq 0$
Power of a Power: To find a power of a power, multiply exponents.	$(a^m)^n = a^{mn}$
Power of a Product: To find a power of a product, find the power of each factor and multiply.	$(ab)^m = a^m \cdot b^m$
Quotient of Powers: To divide powers having the same nonzero base, subtract the exponent of the denominator from the exponent of the numerator.	$\frac{a^m}{a^n} = a^{m-n}, a \neq 0$
Power of a Quotient: To find the power of a quotient, find the power of the numerator and the power of the denominator, then divide.	$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}, b \neq 0$

EXAMPLE 1 Use the properties to simplify.

a. $(-5)^2 \cdot (-5)^4 = (-5)^{2+4} = (-5)^6 = 15{,}625$ — Product of Powers

b. $(x^3)^2 = x^{3 \cdot 2} = x^6$ — Power of a Power

c. $-(2x)^{-5} = -(2)^{-5} \cdot (x)^{-5} = -\frac{1}{2^5} \cdot \frac{1}{x^5} = -\frac{1}{32x^5}$ — Power of a Product

d. $\frac{4^5}{4^2} = 4^{5-2} = 4^3 = 64$ — Quotient of Powers

e. $\left(\frac{x}{3}\right)^4 = \frac{x^4}{3^4} = \frac{x^4}{81}$ — Power of a Quotient

EXAMPLE 2 Simplify the expression.

$\left(\frac{3^2 \cdot 3^2}{3}\right)^3 = \left(\frac{3^4}{3}\right)^3$	Product of Powers
$= (3^{4-1})^3$	Quotient of Powers
$= (3^3)^3$	Subtract exponents.
$= 3^9$	Power of a Power
$= 19{,}683$	Evaluate the exponent.

Name ______________________ Date ______________

Practice

Simplify.

1. $5^2 \cdot 5^4$

2. $(y^3)^4$

3. $\frac{3^5}{3^3}$

4. $\left(\frac{z}{5}\right)^3$

5. $\frac{(-3x)^8}{(-3x)^5}$

6. $\left(\frac{w^5}{w^3}\right)^3$

7. $7^4 \cdot 7 \cdot 7^5$

8. $(-8)^3(-8)^9(-8)$

9. $(xy)^4$

10. $\left(\frac{6}{t}\right)^3 \cdot \left(\frac{t}{3}\right)^2$

11. $[(-4)^3]^7$

12. $(-3s)^{-3}$

13. $\frac{3^9 \cdot 3^6}{3^2}$

14. $\frac{1}{(2uv)^8} \div \frac{1}{(uv)^{17}}$

15. $(x^{-2})(x^{-3})(x^{-4})^{-5}$

Extend Your Skills

16. Fill in the blanks with properties to explain the steps used to simplify the following expression.

$\left(\frac{x^2 \cdot x^6}{x \cdot x^3}\right)^2 \cdot \left(\frac{x^4 \cdot x^5}{x^8}\right)^7$ Original Expression

$= \left(\frac{x^8}{x^4}\right)^2 \cdot \left(\frac{x^9}{x^8}\right)^7$ a) ______________

$= (x^4)^2 \cdot (x)^7$ b) ______________

$= x^8 \cdot x^7$ c) ______________

$= x^{15}$ d) ______________

Puzzle

What is a kitten after it is 7 months old?

Hint:
The same number is missing from each of the boxes. What is the missing number?

$$\left(\frac{w^{10}}{w \cdot w^7}\right)^4 \cdot \left(\frac{w^{10}}{w \cdot w^7}\right)^4 = \left(\frac{w^{10}}{w \cdot w^7}\right)^{\square}$$
$$= \left(\frac{w^{10}}{w^{\square}}\right)^{\square}$$
$$= (w^2)^{\square}$$
$$= w^{16}$$

The kitten is ______________!

Name ____________________

SECTION 6 **Algebra Concepts**

Day 4

Lesson 3: Zero and Negative Exponents

Let a be a nonzero number, and n be an integer.

Words	Algebra	Example
a to the zero power is 1.	$a^0 = 1, a \neq 0$	$5^0 = 1$
a^{-n} is the reciprocal of a^n.	$a^{-n} = \frac{1}{a^n}, a \neq 0$	$2^{-1} = \frac{1}{2}$
a^n is the reciprocal of a^{-n}.	$a^n = \frac{1}{a^{-n}}, a \neq 0$	$2 = \frac{1}{2^{-1}}$

EXAMPLE 1 Evaluate the expression.

a. $4^0 = 1$ Definition of zero exponent

b. $2^{-5} = \frac{1}{2^5}$ Definition of negative exponent

$= \frac{1}{32}$ Evaluate power.

c. $\left(\frac{1}{5}\right)^{-3} = \frac{1}{\left(\frac{1}{5}\right)^3}$ Definition of negative exponent

$= \frac{1}{\left(\frac{1}{125}\right)}$ Evaluate power.

$= 125$ Divide

[redacted]

EXAMPLE 2 Evaluate the expression when $x = 3$.

a. x^{-4} **b.** 2^{-x} **c.** $\left(\frac{1}{x}\right)^0$

Substitute $x = 3$ into each expression.

a. $x^{-4} = 3^{-4} = \frac{1}{3^4} = \frac{1}{81}$ **b.** $2^{-x} = 2^{-3} = \frac{1}{2^3} = \frac{1}{8}$ **c.** $\left(\frac{1}{x}\right)^0 = \left(\frac{1}{3}\right)^0 = 1$

Practice: First Try

Evaluate the expression.

1. 9^0 **2.** 4^{-3} **3.** 10^{-4} **4.** $\left(\frac{1}{5}\right)^{-4}$

Name ________________________________ Date ______________

Practice: Second Try

Evaluate the expression.

1. 3^0 **2.** $\left(\frac{1}{3}\right)^{-3}$ **3.** 5^{-4} **4.** $\left(\frac{1}{10}\right)^{-3}$

5. 6^{-2} **6.** $\left(\frac{1}{25}\right)^{0}$ **7.** $\left(\frac{1}{4}\right)^{-2}$ **8.** 2^{-4}

9. $(-8)^3$ **10.** 200^0 **11.** -2^{-5} **12.** $\left(-\frac{1}{2}\right)^{-4}$

Evaluate the expression when $x = 2$.

13. x^{-6} **14.** 5^{-x} **15.** $\left(\frac{1}{x}\right)^{-4}$ **16.** $\left(\frac{1}{8}\right)^{-x}$

Extend Your Skills

17. A *half-life* is the amount of time that it takes for a radioactive substance to decay to one half of its original quantity. Suppose radioactive decay causes 320 grams of a substance to decrease 320×2^{-4} after 4 half-lives. Evaluate 320×2^{-4} to determine how many grams of the substance are left.

18. Atoms are very small. An atom of gold has a radius of approximately 0.1441 nanometers. A nanometer is 10^{-9} meter. What part of a meter is the radius of a gold atom? Write your answer as a decimal.

Puzzle

Shade each square that has a value that is greater than 1. What letter do you see?

$\left(\frac{1}{2}\right)^{-2}$	$\left(\frac{4}{5}\right)^{2}$	$\left(\frac{1}{3}\right)^{3}$	$\left(\frac{1}{5}\right)^{-4}$
$\left(\frac{2}{5}\right)^{-1}$	$\left(\frac{1}{5}\right)^{-2}$	$\left(\frac{2}{5}\right)^{2}$	$\left(\frac{1}{2}\right)^{-3}$
$\left(\frac{1}{3}\right)^{-2}$	$\left(\frac{1}{2}\right)^{5}$	$\left(\frac{3}{8}\right)^{-3}$	$\left(\frac{2}{3}\right)^{-2}$
$\left(\frac{9}{10}\right)^{-3}$	$\left(\frac{3}{4}\right)^{2}$	$\left(\frac{1}{9}\right)^{3}$	$\left(\frac{1}{4}\right)^{-5}$

Name ______________________ Date ______________

SECTION 6
Algebra Concepts

Day 5

Lesson 6: Scientific Notation

Scientific notation is a way to write very small or very large numbers using powers of 10. The table shows some powers of 10.

Power of 10	10^{-3}	10^{-2}	10^{-1}	10^{0}	10^{1}	10^{2}	10^{3}
Value	0.001	0.01	0.1	1	10	100	1000

EXAMPLE 1 Write 9,100,000 in scientific notation.

9,100,000 **Move the decimal point 6 places to the left.**

9.1×10^6 **Use 6 as an exponent of 10.**

HINT
Move the decimal point as needed to get a number that is at least 1, but less than 10.

EXAMPLE 2 Write 0.0000005 in scientific notation.

0.0000005 **Move the decimal point 7 places to the right.**

5×10^{-7} **Use −7 as an exponent of 10.**

HINT
Use *positive* exponents for large numbers.
Use *negative* exponents for small numbers.

EXAMPLE 3 Write 2.3×10^4 in standard form.

23,000 **The exponent of 10 is 4.**

Move the decimal point 4 places to the right.

EXAMPLE 4 Write 8×10^{-5} in standard form.

0.00008 **The exponent of 10 is −5.**

Move the decimal point 5 places to the left.

Practice: First Try

Write the power of 10 that makes a true statement.

1. $8{,}000{,}000 = 8 \times$ _____

2. $450{,}000 = 4.5 \times$ _____

3. $0.00006 = 6 \times$ _____

4. $0.000000077 = 7.7 \times$ _____

5. $380{,}000{,}000 = 3.8 \times$ _____

6. $0.00092 = 9.2 \times$ _____

4

Name ______________________________ Date ______________

Practice: Second Try

Write the number in scientific notation.

1. 87,000,000
2. 5,000,000,000
3. 420,000
4. 926,000
5. 0.0000015
6. 0.0000008
7. 0.0009
8. 0.000000398
9. 0.0000031

Write the number in standard form.

10. 5.9×10^6
11. 4.58×10^4
12. 9.0×10^2
13. 4×10^8
14. 7.5×10^{-5}
15. 8.2×10^{-6}
16. 1.82×10^{-4}
17. 3×10^{-9}
18. 5.5×10^{-3}

Extend Your Skills

Give a complete answer.

19. In the year 2005, a company made a profit of about $\$3.8 \times 10^5$. In 2006, the company made about \$40,000. In which year did the company make a greater profit? Explain.

20. The size of Specimen A is 5×10^{-4} cm. The size of Specimen B is 0.00055 cm. Which specimen is smaller? Explain.

21. Explain why each number is <u>not</u> written in scientific notation.
    a. 41×10^3
    b. 0.3×10^{-7}

22. Arrange the numbers in increasing order.
    4.25×10^7 $\quad$ 4.25×10^{-7} $\quad$ 4.25×10^8 $\quad$ 5.24×10^6

Puzzle

The mass of Earth is about 6 trillion trillion kilograms. Write this number!

______________________ ______________________

Standard Notation $\qquad$ Scientific Notation

Name ______________________________ Date ________________

SECTION 6

Algebra Concepts

Day 6

Lesson 5: Rational and Irrational Numbers

A **rational** number can be written in the form $\frac{a}{b}$, where a and b are integers and $b \neq 0$. Rational numbers include integers, fractions, and decimals that terminate or repeat. Irrational numbers cannot be written in the form $\frac{a}{b}$. **Irrational** numbers include square roots of integers that are not perfect squares and decimals that do not terminate or repeat.

Real Numbers

EXAMPLE 1 Tell whether each number is rational or irrational. If it is rational, write it in $\frac{a}{b}$ form.

a. -15 — The number -15 is rational. $-15 = \frac{-15}{1}$

b. $0.454545\ldots$ — The number $0.454545\ldots$ is rational. $0.454545\ldots = \frac{45}{49}$

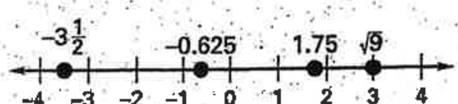
c. $\sqrt{14}$ — The number $\sqrt{14}$ is irrational because 14 is not a perfect square.

d. $\sqrt{49}$ — The number $\sqrt{49}$ is rational. $\sqrt{49} = \frac{7}{1}$

e. $8\frac{1}{3}$ — The number $8\frac{1}{3}$ is rational. $8\frac{1}{3} = \frac{25}{3}$

EXAMPLE 2 Order the numbers -0.625, $\sqrt{9}$, $-3\frac{1}{2}$, 1.75 from least to greatest.

Graph the numbers on a number line.



Read the numbers from left to right.

The numbers ordered from least to greatest are $-3\frac{1}{2}$, -0.625, 1.75, $\sqrt{9}$.

Practice: First Try

Show that the number is rational by writing it in $\frac{a}{b}$ form. look at examples for help

1. 25 **2.** 1.3 **3.** $\sqrt{36}$

4. $-4\frac{1}{4}$ **5.** -0.5 **6.** $3\frac{1}{6}$

Name ______________________________ Date ______________

Practice: Second Try

Tell whether the number is rational or irrational. If the number is rational, write it in $\frac{a}{b}$ form.

1. 4.52 **2.** -19 **3.** -10.6

4. $-\sqrt{16}$ **5.** 0.96 **6.** $0.262662666\ldots$

7. $\sqrt{15}$ **8.** $\sqrt{121}$ **9.** $0.\overline{3}$

10. $\frac{3}{5}$ **11.** $-\frac{1}{8}$ **12.** $6\frac{2}{3}$

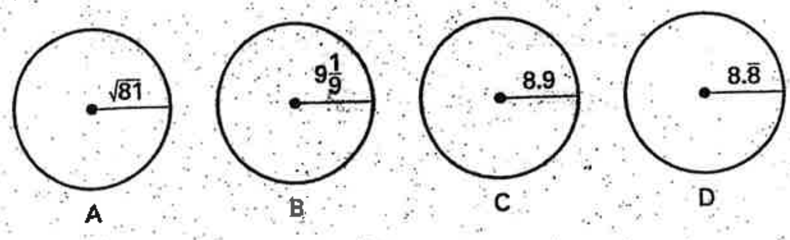
Order the numbers from least to greatest.

13. $\sqrt{25}, \frac{1}{5}, 0.\overline{5}, -0.5$ **14.** $0.\overline{6}, \frac{6}{10}, -6\frac{1}{10}, -\sqrt{36}$

Extend Your Skills

15. The area of a rectangular picture frame is 150 square inches. Its length measures 11 inches. Is the width of the frame rational or irrational? Explain.

16. List the cirles below in order from least to greatest, based on the length of the radius of each circle. (Note: The circles are not drawn to scale.)



Puzzle

In the game board below, draw an **X** in each box containing a rational number. Draw an **O** in each box containing an irrational number.

2.6363	$\sqrt{27}$	-21
$-\frac{36}{\sqrt{7}}$	$-\sqrt{39}$	$\sqrt{121}$
$\sqrt{112}$	0.375	$4\frac{1}{8}$

Who won the game with three in a row, X's or O's?

Name ______________________ Date ______________

SECTION 6

Algebra Concepts

Day 7

Lesson 19: Solving One-Step Equations

One-step equations can be solved using any of the four basic operations.

Use the *inverse operation*, or opposite operation of what is in the equation.

Operation	Inverse Operation
Addition	Subtraction
Subtraction	Addition
Multiplication	Division
Division	Multiplication

[redacted]

EXAMPLE You can use all four operations to solve one-step equations.

Using Addition	Using Subtraction
$a - 2 = 10$ $a - 2 + 2 = 10 + 2$ Add. $a = 12$ Check: $12 - 2 = 10$ ✓	$y + 2 = 10$ $y + 2 - 2 = 10 - 2$ Subtract. $y = 8$ Check: $8 + 2 = 10$ ✓
Using Multiplication	**Using Division**
$\frac{n}{2} = 10$ $\frac{n}{2} \cdot 2 = 10 \cdot 2$ Multiply. $n = 20$ Check: $\frac{20}{2} = 10$ ✓	$2x = 10$ $\frac{2x}{2} = \frac{10}{2}$ Divide. $x = 5$ Check: $2(5) = 10$ ✓

Practice: First Try

Solve the equation. Check your solution.

1. $x - 1 = 8$ **2.** $m - 6 = 6$ **3.** $c + 3 = 7$ **4.** $6d = 24$

5. $\frac{r}{2} = 9$ **6.** $2n = 6$ **7.** $9z = 27$ **8.** $h \div 3 = 7$

9. $y + 9 = 15$ **10.** $\frac{a}{6} = 5$ **11.** $c - 19 = 20$ **12.** $t + 8 = 18$

Name ______________________ Date ______________

SECTION 6

Algebra Concepts

Lesson 20: Solving Two-Step Equations

☆ Must show work on Separate Sheet of Paper ☆

Use two operations to solve a two-step equation. To determine which operation to undo first, use the order of operations in reverse.

EXAMPLE 1 Solve the equation.

$2x - 1 = 7$

$2x - 1 + 1 = 7 + 1$ Add 1 to each side.

$2x = 8$ Simplify.

$\frac{2x}{2} = \frac{8}{2}$ Divide each side by 2.

$x = 4$ Simplify.

Check: $2(4) - 1 = 7$ ✓

[redacted]

EXAMPLE 2 Solve the equation.

$\frac{n}{5} + 2 = 6$

$\frac{n}{5} + 2 - 2 = 6 - 2$ Subtract 2 from each side.

$\frac{n}{5} = 4$ Simplify.

$\frac{n}{5} \cdot 5 = 4 \cdot 5$ Multiply each side by 5.

$n = 20$ Simplify.

Check: $\frac{20}{5} + 2 = 6$ ✓

[redacted]

Practice: First Try (Complete circled Equations)

Solve each equation. Check your solution.

1. $3y - 4 = 5$
2. $2a + 5 = 13$
3. $\frac{m}{4} - 1 = 6$
4. $\frac{b}{9} - 3 = 1$
5. $6c - 7 = 11$
6. $\frac{y}{5} + 12 = 18$

Name ______________________ Date ______________

SECTION 6

Algebra Concepts

Day 8

Lesson 20: Solving Two-Step Equations

☆ Must show work on Separate Sheet of Paper ☆

Use two operations to solve a two-step equation. To determine which operation to undo first, use the order of operations in reverse.

EXAMPLE 1 Solve the equation.

$2x - 1 = 7$

$2x - 1 + 1 = 7 + 1$ Add 1 to each side.

$2x = 8$ Simplify.

$\frac{2x}{2} = \frac{8}{2}$ Divide each side by 2.

$x = 4$ Simplify.

Check: $2(4) - 1 = 7$ ✓

EXAMPLE 2 Solve the equation.

$\frac{n}{5} + 2 = 6$

$\frac{n}{5} + 2 - 2 = 6 - 2$ Subtract 2 from each side.

$\frac{n}{5} = 4$ Simplify.

$\frac{n}{5} \cdot 5 = 4 \cdot 5$ Multiply each side by 5.

$n = 20$ Simplify.

Check: $\frac{20}{5} + 2 = 6$ ✓

Practice: First Try (Complete circled Equations)

Solve each equation. Check your solution.

1. $3y - 4 = 5$

2. $2a + 5 = 13$

3. $\frac{m}{4} - 1 = 6$

4. $\frac{b}{9} - 3 = 1$

5. $6c - 7 = 11$

6. $\frac{y}{5} + 12 = 18$

Name ______________________________ Date ______________

Practice: Second Try (Complete Circled Equations)

Solve each equation. Check your solution.

1. $8s - 10 = 6$

2. $\frac{a}{3} + 5 = 9$

3. $\frac{h}{8} + 2 = 6$

4. $4t - 9 = 3$

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

6. $9g + 1 = 82$

7. $\frac{k}{6} - 2 = 2$

8. $\frac{w}{2} + 3 = 10$

9. $5x + 3 = 33$

10. $10p + 7 = 17$

11. $6c - 7 = 11$

12. $\frac{z}{7} - 3 = 4$

13. $2j - 5 = 23$

14. $\frac{a}{3} + 8 = 9$

15. $4m + 12 = 16$

Extend Your Skills

16. Miriam is going to the county fair. Each ride ticket costs \$2, and admission costs \$7. Miriam has \$25 to spend at the fair. Write and solve an equation to determine how many ride tickets t Miriam can buy.

Puzzle

Solve each equation. Then assign letters to the answers according to the code A = 1, B = 2, C = 3, etc. Unscramble the letters to reveal a word.

$2x - 18 = 34$ $\quad \frac{x}{3} - 6 = 1$ $\quad 7x + 5 = 40$ $\quad 3x - 11 = 25$ $\quad \frac{x}{2} + 7 = 20$ $\quad \frac{x}{4} + 2 = 6$

$x =$ ____ $x =$ ____ $x =$ ____ $x =$ ____ $x =$ ____ $x =$ ____

____ ____ ____ ____ ____ ____

Name ______________________ Date ______________

SECTION 6

Algebra Concepts

Day 9

Lesson 26: Solving Multi-Step Equations

Solving some equations requires several steps. Always simplify sides of an equation first by combining like terms. Then use inverse operations to solve the equation.

EXAMPLE 1 Solve the equation $7x - 3(x + 2) = 14$.

$7x - 3(x + 2) = 14$	Original equation.
$7x - 3x - 6 = 14$	Distributive Property
$4x - 6 = 14$	Combine like terms.
$4x - 6 + 6 = 14 + 6$	Add 6 to each side.
$4x = 20$	Simplify.
$\frac{4x}{4} = \frac{20}{4}$	Divide each side by 4.
$x = 5$	Simplify.

EXAMPLE 2 Solve the equation $28 - 3x = 5x - 12$.

$28 - 3x = 5x - 12$	Original equation.
$28 - 3x + 3x = 5x - 12 + 3x$	Add $3x$ to both side.
$28 = 8x - 12$	Simplify.
$28 + 12 = 8x - 12 + 12$	Add 12 to each side.
$40 = 8x$	Simplify.
$\frac{40}{8} = \frac{8x}{8}$	Divide each sides by 8.
$5 = x$	Simplify.

Practice: First Try

Solve each equation.

1. $5x + 4 = 2x + 7$

2. $8 + 4x = 20 + 8x$

3. $8x = 3(5 + x)$

4. $7 - 2x = 4x - 5$

5. $2(6x - 2x) = 56$

6. $7(3x + 4) = 5(5x - 4)$

Name ____________________ Date __________

Practice: Second Try

Solve each equation.

1. $4x - 9x + 5 = 10$

2. $14x - 8 = 10 + 5x$

3. $6 + 2x = 4(x + 3)$

4. $11x + 9 = 10x - 9$

5. $8 - 3(5 - x) = 14$

6. $7x - 2 = 8x - 2$

7. $17x + 4 = -21 - 8x$

8. $10(x + 2) = 4(x + 8)$

6. ALGEBRA CONCEPTS
26. Solving Multi-Steps

Multiply both sides of the equation by the LCM. Then solve.

9. $\frac{1}{2}(x + 8) + 3 = 18$

10. $5\left(\frac{3}{4}x + 3\right) = -10 - \frac{5}{4}x$

Multiply both sides of the equation by 10. Then solve.

11. $1.3x + 7.2 = -0.7x - 2.8$

12. $1.3(x + 16) = 2.6(x + 5)$

Extend Your Skills

13. Barry is playing fetch with his dog. The dog runs at a rate of 50 feet per second. If the dog is 5 feet away from Barry when he throws a ball, how long will it take the dog to get to the ball if it lands 130 feet away from Barry? Use the equation $d = 50t + 5$ where d is the distance the dog is from Barry after t seconds.

14. You have to read 3 books during summer vacation. Each book has 241 pages. If you have already read 115 pages, how many pages do you have to read per week if you have 4 weeks left of summer vacation? Explain the steps required to solve the problem.

Tell whether the equation has 0, 1, or infinitely many solutions.

15. $3x + 9 = 2x + 4$

16. $2x + 7 = 2(x + 3)$

17. $4(x + 5) = 2(x + 10)$

Puzzle

Fill in the blanks and work backward to find the original equation!

$$x = 4$$

$$\frac{4x}{\square} = \frac{16}{\square}$$

$$4x = 16$$

$$4x + \square - 12 = \square - 12$$

$$4x + \square = \square$$

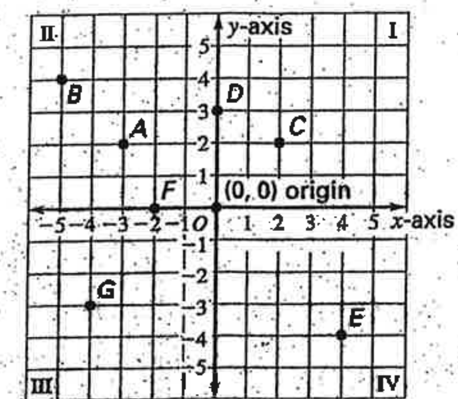
Name ______________________ Date ______________

SECTION 6 Algebra Concepts

Day 10

Lesson 25: Points in the Coordinate Plane

You can locate points in a **coordinate plane.** A horizontal **x-axis** and a vertical **y-axis** intersect at the **origin,** dividing the plane into four **quadrants,** numbered I, II, III, and IV.



To locate a point in the coordinate plane, use an **ordered pair.** The numbers in an ordered pair (x, y) are **coordinates,** with the **x-coordinate** followed by the **y-coordinate.**

EXAMPLE In the coordinate plane above, locate point A. Starting at the origin, count 3 units left and 2 units up. Point A is located at $(-3, 2)$.

Practice: First Try

Use the coordinate plane above. Write the coordinates for each point.

1. B **2.** C **3.** D

4. E **5.** F **6.** G

Draw a coordinate plane. Draw and label each point at the location indicated.

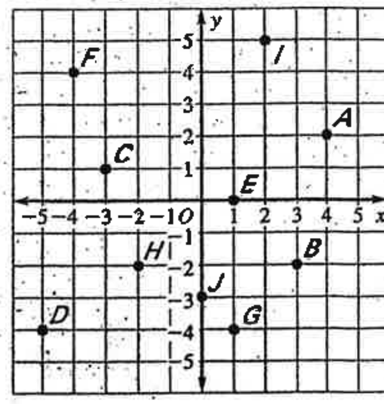
7. $U(-1, 4)$ **8.** $V(3, 3)$ **9.** $W(0, -3)$

10. $X(-5, -2)$ **11.** $Y(2, 0)$ **12.** $Z(4, -2)$

Name ______________________________ Date ______________

Practice: Second Try

Write the coordinates for each point.



1. *A*

2. *B*

3. *C*

4. *D*

5. *E*

6. *F*

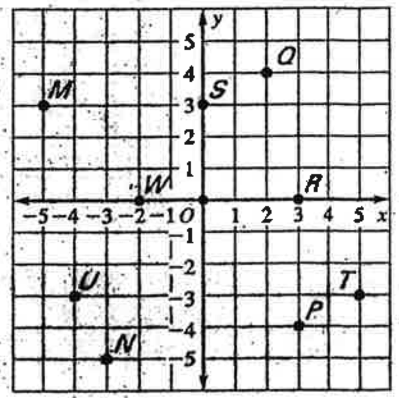
7. *G*

8. *H*

9. *I*

10. *J*

Write the point for the given coordinates.



11. (5, −3)

12. (−4, −3)

13. (0, 0)

14. (2, 4)

15. (3, −4)

16. (0, 3)

17. (−3, −5)

18. (−2, 0)

19. (3, 0)

20. (−5, 3)

6. ALGEBRA CONCEPTS
25. Coordinate Plane

Extend Your Skills

Imagine a neighborhood on a coordinate grid, with your home at the origin and the top of the page as due north. Hint: Begin at the origin.

21. If you travel 3 blocks west, then 5 blocks north to get to school, what quadrant is your school in?

22. If you travel 2 blocks east, then 1 block south to get to your friend's house, what quadrant is your friend's house in?

23. If you travel 2 blocks west, then 4 blocks south to get to the store, what quadrant is the store in?

Puzzle

Draw a coordinate plane. Draw points as indicated. Then connect them in order using straight lines. What figure do you get?

(−3, 3) to (3, 0) to (−3, −3) to (0, 3) to (3, −3) to (−3, 3)