Math 0306

SUPPLEMENT AND STUDY GUIDE

LONE STAR COLLEGE
NORTH HARRIS
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INFORMATION
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# Prealgebra Assignments
## Math 0306

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Problems may be added to or deleted from any assignment.

* The Real Number System and the Introduction to Geometry are found in the NHC Math 0306 Supplement and Study Guide.

mot - multiples of three - 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57, 60, 63, 66, 69, 72, 75, 78, 81, 84, 87, 90, 93, 96, 99, 102, 105, 108, 111, 114, …
Math 0306 Outcomes

1. Timed Whole Numbers (5 points)
   Add, subtract, multiply and divide whole numbers with a four second time limit on each problem. There are twenty problems.

2. Whole Numbers (5 points)
   Add, subtract, multiply and divide whole numbers including problems involving order of operations. There are seventeen problems.

3. Integers (15 points)
   Add, subtract, multiply and divide integers including problems involving order of operations. There are eighteen problems.

4. Fractions (15 points)
   Add, subtract, multiply and divide fractions including problems involving order of operations. Five problems involve locating a point on a number line. There are twenty-five problems.

5. Decimals (5 points)
   Add, subtract, multiply and divide decimal numbers including problems involving order of operations. There are fourteen problems.

6. Combine Like Terms (5 points)
   Combine like terms including problems involving grouping symbols. There are ten problems.

7. Solve Equations (15 points)
   Solve equations in one variable. Some equations contain fractions and decimals. There are fourteen problems.

8. Ratio, Proportion and Percent (10 points)
   There are nine problems involving ratio and proportion and six problems involving percent.

9. Geometric Figures (10 points)
   There are five problems identifying the type of angle, twelve problems involving finding the size of an angle from a geometric figure and three problems involving similar triangles.

10. Perimeter, Area and Volume (15 points)
    There are five problems involving perimeter, seven problems involving area and five problems involving volume.
**Take a Teacher Home Videotapes**

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Videotapes may be checked out in the NHC Library to take home or at the Main Desk in the Learning Center (LC) to view in the LC. Booklets to accompany the Final Exam Review may be checked out at the Main Desk in the LC or downloaded from the NHC Learning Center webpage.
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Internet Math Resources

Lone Star College-North Harris Mathematics Department
Located at: nhmath.lonestar.edu

Information on:
- Contacts
- Faculty
- Course Descriptions
- Course Handouts
- Links to the Math Lab, AfterMath Student Organization, and Final Exam Reviews

Internet Math Resources for 0306
Description of Icons:

- Getting Started: This icon explains how the resource is used.
- Course Materials: This location contains the department course document, the video list, the software list, and course outcome information.
- Calendar: LSCS general information and the target dates for each of the outcomes are on this calendar.
- Suggestion Box: Suggestions are always welcome.
- Ask a Tutor: This location is for math questions. Put the number of the problem in the subject area so that all the questions on that problem are together. Equation editor is available.
- NHC Math Lab: This icon links to the Math Lab Web Page.
- Whiteboard: This is available on the Course Menu which is on the left. Students may work together if both are in whiteboard at the same time, but anyone can erase EVERYTHING!
- Reviews: There is a multiple choice review for each chapter.
- Math Lab Software and Outcome Reviews: Assigned labs are located here. When working on the labs at home, results must be saved to a floppy or on a flash drive and downloaded on a computer at NHC. The Outcome Reviews are not graded.
- Games: Have FUN!
## Math 0306 Software Topics

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### Timed Exercises

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Math Lab Software Topics Displayed on the Computer Screen

Students can complete the Math Lab computer assignments in the Learning Center, in the Mathematics Department computer labs (located in WNSP 111, 117, and 118) or at home via the internet.

To access the Math Lab software on an NHC computer:

Double click on the Math Lab icon on the desktop or go to Start, Programs, Math, then Math Lab. Click Continue, Continue, Prealgebra, then you will see the screen below. Select a lesson. You will be prompted to enter your NHC seven-digit student ID number, then press enter.
Math 0306 Software Lessons Detail

Sec. 1.7  Order of Operations
There are three problems with exponents, seven problems with order of operations including exponents and one area problem.

Sec. 2.2  Adding Integers
There are ten problems to add two or three integers and six problems to evaluate $x \pm y$, and $x \pm y \pm z$.

Sec. 2.3  Adding and Subtracting Integers
There are fifty problems of the type $a + b$, $a - b$, and $a - (-b)$ where $a$ and $b$ are integers between $-10$ and $10$.

Sec. 2.4  Multiplying and Dividing Integers
There are ten problems to multiply or divide two or three integers and six problems to evaluate an expression containing products and quotients.

Sec. 2.5  Order of Operations with Integers
There are twelve problems involving order of operations with integers.

Sec. 2.1 Simplifying Algebraic Expressions
There are fifteen problems to combine similar terms. Problems range from $3x + 8x$ to $3(2x + 5) - 2(5x + 1)$.

Sec. 2.2 Solving Equations: The Addition Property of Equality
This lesson contains twelve equations. All equations simplify to $x + a = b$.

Sec. 2.2 Solving Equations: The Division property of Equality
This lesson contains twelve equations. All equations simplify the $ax + b = c$. The variable is only on one side of each equation. All solutions are integers.

Sec. 3.3 Solving Equations in One Variable
There are twelve equations. Some have the variable on both sides of the equation. Some of the equations contain parenthesis. All of the solutions are integers.

Sec. 4.1  Introduction to Fractions and Equivalent Fractions
There are ten problems to find a point on a line and ten problems to write an equivalent fraction.

Sec. 4.1a Locate Points on a Line
There are twenty problems that require students to locate rational numbers on the number line be clicking on the line with the mouse.

Sec. 4.2  Factors and Lowest Terms
This lesson contains twelve problems to reduce to lowest terms. Four of the problems contain variables.

Sec. 4.3  Multiplying and Dividing Fractions
There are twelve problems to multiply and divide fractions. Two of the problems contain variables and one is a problem to evaluate an expression.

Sec. 4.5  Add and Subtract Fractions
This lesson contains twelve problems. Six problems are adding or subtracting two fractions, two problems are adding and subtracting three fractions, three fractions contain variables and three problems are equations that contain fractions.

Sec. 4.6  Complex Fractions
There are seven complex fractions to simplify. Two problems contain exponents and one is to evaluate.
Sec. 4.7 Operations on Mixed Numbers
This lesson contains twelve problems to add, subtract, multiply or divide two or three mixed numbers.

Sec. 4.8 Solving Equations Containing Fractions
There are eight equations to solve. Answers will be fractions.

Sec. 5.1 Introduction to Decimals
There are five problems to convert a number from words to decimals, five problems to write a decimal as a fraction and five problems to round off a number.

Sec. 5.2 Adding and Subtracting Decimals
There are twelve problems to add and subtract two or three decimal numbers. Two of the problems are to evaluate.

Sec. 5.3 Multiplying Decimals and Circumference of a Circle
There are twelve problems. Seven of the problems are multiplying two numbers with decimals. Five of the problems are to evaluate an expression.

Sec. 5.4 Dividing Decimals
This lesson contains ten problems to divide two numbers that contain decimals. Two of the problems are to evaluate \( \frac{x}{y} \).

Sec. 5.5 Fractions and Decimals
This lesson contains sixteen problems. Eight problems are to convert numbers from fractions to decimals and decimals to fractions. Four problems are to compare two numbers. Four of the problems are to evaluate an expression using the order of operations.

Sec. 5.6 Equations Using Decimals
There are eight equations to solve. All contain decimals and answers will contain decimals.

Sec. 6.2 Proportions
This lesson contains twelve problems. Six problems are to determine if two ratios form a proportion.

Sec. 6.4 Square Roots and The Pythagorean Theorem
There are twelve problems. Seven problems are to find the square root of numbers that are perfect squares and five problems are to use the Pythagorean Theorem.

Sec. 6.4a Inequalities on a Number Line
There are twelve problems to graph an inequality on a number line by clicking and dragging the mouse.

Sec. 6.5 Problem Solving with Proportions and Similar Triangles
There are eight problems. The first four problems are stated problems and the last four problems are using a proportion to find the side of a similar triangle.

Sec. 7.1 Percents, Decimals, and Fractions
There are sixteen problems. Eight are to convert from a percent to a decimal or a decimal to a percent. Eight are to convert from a fraction to a percent or a percent to a fraction.

Sec. 7.2 Percent Equations and Problem Solving
7.3 There are twelve problems. All problems are to find the percent of a number, what percent of a number or a percent of a number is a certain number.
Sec. 9.1 Introduction to Geometry
There are twenty problems. The problems require the students to find complementary and supplementary angles, work with parallel lines and determine the size of angles of various geometric figures.

Sec. 9.2 Perimeter and Problem Solving
This lesson contains eight problems to find the perimeter of a rectangle, triangle, parallelogram and odd shaped polygons

Sec. 9.3 Area and Volume
There are eight problems to find the area of a rectangle, triangle, circle, and trapezoid. There are four problems to find the volume of a sphere, cone, cylinder and rectangular solid.

Sec. 9.4 Length: U.S. and Metric Systems of Measurements
There are twelve problems. Six are converting in the U.S. system and six are converting in the metric system.

Sec. 9.5 Weight and Mass
There are twelve problems. Six are converting in the U.S. system and six are converting in the metric system.

Sec. 9.6 Capacity: U.S. and Metric Systems of Measurements
There are twelve problems. Six are converting in the U.S. system and six are converting in the metric system.

Timed Exercises

Sec. 1.3, 1.5, 1.6
Whole Numbers Choose Your Time
The students are given four or six seconds to find the sum, difference, product, or quotient of the whole numbers listed in Basic Facts under Addition, Subtraction, Multiplication, and Division on pages 23 and 24 of this supplement.
Timed Whole Numbers
The problems require the students to add, subtract, multiply, and divide whole numbers mentally. The students are given 10 seconds to do the first problems. When they successfully work eight in a row the time decreases by a second. The students must work down to three seconds.

Sec. 2.2, 2.3, 2.4
Timed Integers
The problems require the students to add, subtract, multiply, and divide integers mentally. The students are given 10 seconds to do the first problems. When they successfully work eight in a row the time decreases by a second. The students must work down to three seconds.

Sec. 1.7, 6.4
Squares, Cubes and Square Roots
The students are given four seconds to find the squares, cubes, or square roots of the numbers listed in Basic Facts under Squares, Cubes, and Square Roots on page 24 of this supplement.
BASIC FACTS
AND
FORMULAS
# Basic Facts

## Addition

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## Subtraction

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## Multiplication

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### Cubes

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The value of 0 ÷ 0 is undefined (U).
## Perimeter and Area Formulas

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<th>Drawing</th>
<th>Perimeter/ Circumference</th>
<th>Area</th>
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<td><img src="image1.png" alt="Triangle Drawing" /></td>
<td>$P = a + b + c$</td>
<td>$A = \frac{1}{2} bh$</td>
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<tr>
<td>Parallelogram</td>
<td><img src="image2.png" alt="Parallelogram Drawing" /></td>
<td>$P = a + b + c + d$</td>
<td>$A = bh$</td>
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<td>Rectangle</td>
<td><img src="image3.png" alt="Rectangle Drawing" /></td>
<td>$P = 2l + 2w$</td>
<td>$A = lw$</td>
</tr>
<tr>
<td>Rhombus</td>
<td><img src="image4.png" alt="Rhombus Drawing" /></td>
<td>$P = 4s$</td>
<td>$A = bh$</td>
</tr>
<tr>
<td>Square</td>
<td><img src="image5.png" alt="Square Drawing" /></td>
<td>$P = 4s$</td>
<td>$A = s^2$</td>
</tr>
<tr>
<td>Trapezoid</td>
<td><img src="image6.png" alt="Trapezoid Drawing" /></td>
<td>$P = a + b + c + d$</td>
<td>$A = \frac{1}{2}h(b_1 + b_2)$</td>
</tr>
<tr>
<td>Circle</td>
<td><img src="image7.png" alt="Circle Drawing" /></td>
<td>$C = \pi d \text{ or } 2\pi r$</td>
<td>$A = \pi r^2$</td>
</tr>
</tbody>
</table>
# U.S. and Metric Systems of Measurement Conversion Charts

## LENGTH

**U.S. SYSTEM OF MEASUREMENT**

| 12 inches (in) = 1 foot (ft) | 3 feet = 1 yard (yd) | 5280 feet = 1 mile (mi) |

**METRIC SYSTEM OF MEASUREMENT**

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Meaning</th>
<th>Metric Unit of Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kilo</td>
<td>1000</td>
<td>1 kilometer (km) = 1000 meters (m)</td>
</tr>
<tr>
<td>Hecto</td>
<td>100</td>
<td>1 hectometer (hm) = 100 m</td>
</tr>
<tr>
<td>Deka</td>
<td>10</td>
<td>1 dekameter (dam) = 10 m</td>
</tr>
<tr>
<td>Deci</td>
<td>1/10</td>
<td>1 decimeter (dm) = 0.1 m</td>
</tr>
<tr>
<td>Centi</td>
<td>1/100</td>
<td>1 centimeter (cm) = 0.01 m</td>
</tr>
<tr>
<td>Milli</td>
<td>1/1000</td>
<td>1 millimeter (mm) = 0.001 m</td>
</tr>
</tbody>
</table>

## WEIGHT AND MASS

**WEIGHT: U.S. SYSTEM OF MEASUREMENT**

| 16 ounces (oz) = 1 pound (lb) | 2000 pounds = 1 ton |

**MASS: METRIC SYSTEM OF MEASUREMENT**

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Meaning</th>
<th>Metric Unit of Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kilo</td>
<td>1000</td>
<td>1 kilogram (kg) = 1000 grams (g)</td>
</tr>
<tr>
<td>Hecto</td>
<td>100</td>
<td>1 hectogram (hg) = 100 g</td>
</tr>
<tr>
<td>Deka</td>
<td>10</td>
<td>1 dekagram (dag) = 10 g</td>
</tr>
<tr>
<td>Deci</td>
<td>1/10</td>
<td>1 decigram (dg) = 0.1 g</td>
</tr>
<tr>
<td>Centi</td>
<td>1/100</td>
<td>1 centigram (cg) = 0.01 g</td>
</tr>
<tr>
<td>Milli</td>
<td>1/1000</td>
<td>1 milligram (mg) = 0.001 g</td>
</tr>
</tbody>
</table>

## CAPACITY

**U.S. SYSTEM OF MEASUREMENT**

| 8 fluid ounces (fl oz) = 1 cup (c) | 2 pints = 1 quart (qt) |
| 2 cups = 1 pint (pt) | 4 quarts = 1 gallon (gal) |

**METRIC SYSTEM OF MEASUREMENT**

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Meaning</th>
<th>Metric Unit of Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kilo</td>
<td>1000</td>
<td>1 kiloliter (kl) = 1000 liter (L)</td>
</tr>
<tr>
<td>Hecto</td>
<td>100</td>
<td>1 hectoliter (hl) = 100 L</td>
</tr>
<tr>
<td>Deka</td>
<td>10</td>
<td>1 dekaliter (dal) = 10 L</td>
</tr>
<tr>
<td>Deci</td>
<td>1/10</td>
<td>1 deciliter (dl) = 0.1 L</td>
</tr>
<tr>
<td>Centi</td>
<td>1/100</td>
<td>1 centiliter (cl) = 0.01 L</td>
</tr>
<tr>
<td>Milli</td>
<td>1/1000</td>
<td>1 milliliter (ml) = 0.001 L</td>
</tr>
</tbody>
</table>
THE REAL NUMBER SYSTEM
Sets of Numbers in the Real Number System

**Reals**
A real number is either a rational number or an irrational number.

\[4, -7, 0, \frac{2}{3}, \sqrt{11}\]

**Rationals**
A rational number is any number that can be put in the form \(\frac{p}{q}\) where \(p\) and \(q\) are integers and \(q \neq 0\).

\[3, \frac{12}{6}, -\frac{5}{2}, 4, \frac{1}{7}, \frac{8}{13}\]

**Irrationals**
An irrational number is a nonrepeating, nonterminating decimal.

\[\sqrt{2}, \pi, -\sqrt{7}, 0.121231234\ldots, \sqrt{13}\]

**Non-Integer Fractions**
A non-integer fraction is a fraction whose numerator is not a multiple of the denominator.

\[\frac{1}{2}, -\frac{5}{4}, \frac{8}{3}, \frac{3}{7}\]

**Integers**
The integers consist of the natural numbers, 0, and the opposites of the natural numbers.

\[\ldots -2, -1, 0, 1, 2, 3, \ldots\]

**Whole Numbers**
The whole numbers consist of the natural numbers and 0.

\[0, 1, 2, 3, 4, \ldots\]

**Natural Numbers**
The natural numbers are also referred to as the counting numbers.

\[1, 2, 3, 4, \ldots\]
Real Number System Worksheet
### The Number System

Identify the sets to which each of the following numbers belongs by marking an “X” in the appropriate boxes.

<table>
<thead>
<tr>
<th>Number</th>
<th>Natural Numbers</th>
<th>Whole Numbers</th>
<th>Integers</th>
<th>Rational Numbers</th>
<th>Irrational Numbers</th>
<th>Real Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. $-\sqrt{17}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. $-2$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. $\frac{9}{37}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. $0$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. $-6.06$</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. $4.5\overline{6}$</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. $3.050050005\ldots$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. $18$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. $\frac{-43}{0}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. $\pi$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. $0.634$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. $\sqrt{225}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. $0.634$</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>14. $\frac{4}{\sqrt{49}}$</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>15. $-\sqrt{64}$</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Number</td>
<td>Natural Numbers</td>
<td>Whole Numbers</td>
<td>Integers</td>
<td>Rational Numbers</td>
<td>Irrational Numbers</td>
<td>Real Numbers</td>
</tr>
<tr>
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<td>--------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>16.</td>
<td>( \sqrt{13} )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>-5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>( \frac{2}{3} )</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>19.</td>
<td>-0.083</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>20.</td>
<td>27</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>21.</td>
<td>2.647</td>
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<td></td>
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<td></td>
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<tr>
<td>22.</td>
<td>3.0505</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>-198</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>( -\frac{1}{2} )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Answers**

1. IN, R  
2. RN, R  
3. RN, R  
4. RN, R  
5. RN, R  
6. IN, R  
7. IN, R  
8. None
9. None  
10. RN, R  
11. RN, R  
12. RN, R  
13. RN, R  
14. RN, R  
15. I, RN, R  
16. I, RN, R  
17. I, RN, R  
18. RN, R  
19. RN, R  
20. RN, R  
21. RN, R  
22. I, RN, R  
23. I, RN, R  
24. N, W, I, RN, R  
25. N, W, I, RN, R  

26
The Real Number Line Worksheet

Graph the number on the real number line.

1. \( \frac{3}{2} \)

2. \( -2 \frac{1}{2} \)

3. -4.5

4. 0.5

5. \( \sqrt{17} \)

6. \( -\sqrt{10} \)

7. \( -\sqrt{24} \)

8. \( \sqrt{15} \)

Graph.

9. the real numbers greater than 4

10. the real numbers greater than 1

11. the real numbers less than 0

12. the real numbers greater than -2

13. the real numbers less than -3

14. the real numbers less than 5

15. the real numbers less than -4

16. the real numbers less than -2

17. the real numbers between 2 and 6

18. the real numbers between -3 and 1

19. the real numbers between -5 and -1

20. the real numbers between -3 and 0
Solve.

21. For the inequality \( x \geq 6 \), which numbers listed below make the inequality true?
   a. -2.6  
   b. 0  
   c. 6  
   d. \( \sqrt{83} \)

22. For the inequality \( x < 3 \), which numbers listed below make the inequality true?
   a. \(-\sqrt{21}\)  
   b. 0  
   c. 3  
   d. 3.02

23. For the inequality \( x \leq -5 \), which numbers listed below make the inequality true?
   a. 6  
   b. -5  
   c. 0  
   d. \(-\sqrt{5}\)

24. For the inequality \( x \geq -2 \), which numbers listed below make the inequality true?
   a. -5  
   b. -2  
   c. -1.6  
   d. \(\sqrt{3}\)

What values of the variable \( x \) make the inequality true?

25. \( x > 4 \)  
26. \( x < -3 \)  
27. \( x \leq -6 \)  
28. \( x \geq 2 \)

Graph the inequality on the real number line.

29. \( x > -3 \)
   \[\text{Graph:} \quad \langle \text{-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6}\rangle\]

30. \( x < 5 \)
   \[\text{Graph:} \quad \langle \text{-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6}\rangle\]

31. \( x \geq 0 \)
   \[\text{Graph:} \quad \langle \text{-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6}\rangle\]

32. \( x \leq -4 \)
   \[\text{Graph:} \quad \langle \text{-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6}\rangle\]

33. \( x < -1 \)
   \[\text{Graph:} \quad \langle \text{-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6}\rangle\]

34. \( x \geq 3 \)
   \[\text{Graph:} \quad \langle \text{-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6}\rangle\]

35. \( x \leq 1 \)
   \[\text{Graph:} \quad \langle \text{-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6}\rangle\]

36. \( x > -2 \)
   \[\text{Graph:} \quad \langle \text{-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6}\rangle\]
21. c, d  
23. b  
25. All real numbers greater than 4 make the inequality true.
27. All real numbers less than or equal to -6 make the inequality true.

INTRODUCTION TO GEOMETRY
Geometry Concepts

Figures that lie in a plane are called **plane figures**.

These are all **plane figures**.

<table>
<thead>
<tr>
<th>Polygon</th>
<th>No. of Sides</th>
<th>Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triangle</td>
<td>3</td>
<td><img src="image" alt="Triangle" /></td>
</tr>
<tr>
<td>Quadrilateral</td>
<td>4</td>
<td><img src="image" alt="Quadrilateral" /></td>
</tr>
<tr>
<td>Pentagon</td>
<td>5</td>
<td><img src="image" alt="Pentagon" /></td>
</tr>
<tr>
<td>Hexagon</td>
<td>6</td>
<td><img src="image" alt="Hexagon" /></td>
</tr>
<tr>
<td>Heptagon</td>
<td>7</td>
<td><img src="image" alt="Heptagon" /></td>
</tr>
<tr>
<td>Octagon</td>
<td>8</td>
<td><img src="image" alt="Octagon" /></td>
</tr>
<tr>
<td>Nonagon</td>
<td>9</td>
<td><img src="image" alt="Nonagon" /></td>
</tr>
<tr>
<td>Decagon</td>
<td>10</td>
<td><img src="image" alt="Decagon" /></td>
</tr>
</tbody>
</table>

**A polygon** is a plane closed figure determined by ***three or more*** line segments.

What happens as the number of sides of a polygon increases?
A **circle** is defined as a set of points in a plane equidistant from a given point called the center.

As the number of sides increases, the plane figure becomes more circular.

A **diameter** is a line segment connecting any two points of the circle passing through the center of the circle.

A **radius** is a line segment connecting the center of the circle with any point on the circle.

A diameter is equal to two radii.

\[ d = 2r \]
Triangle Classification by **Sides:**

- Equilateral
- Isosceles
- Scalene

Triangle Classification by **Angles:**

- Acute
- Obtuse
- Right

The sum of the measures of the interior angles of a triangle is **180 degrees.**
If the two nonparallel sides of a trapezoid are equal in length, it is called an **isosceles trapezoid**.

If all the angles of a parallelogram measure 90, it is called a **rectangle**.

If all the sides of a parallelogram are the same length, it is called a **rhombus**.

If all the sides of a parallelogram are the same length and the angles measure 90, it is called a **square**.

Two measures of plane figures are important to mathematicians:

a. the distance around a plane figure called the **perimeter** or **circumference** and

b. the number of square units in the interior of a plane figure called the **area**.
The perimeter of every polygon may be found by adding all the sides.

Equilateral Triangle Shortcut

\[ P = 3s \]

Rectangle Shortcut

\[ P = 2l + 2w \]
The **circumference** is the distance around a circle.

Circumference + Diameter always results in the same ratio.

This number is named “pi” (π) and is approximately (≈) equal to $\frac{22}{7}$ or 3.14.

\[
\frac{\text{Circumference} (C)}{\text{Diameter} (d)} = \pi
\]

or

\[C = \pi d\]

Since \(d = 2r\),

\[C = \pi(2r) \text{ or } C = 2\pi r\]

**Area**

Area is measured in square units. A square unit is a square one unit on each side.

For example, start with a rectangle with length (l) 3 units and width (w) 2 units.

\[A = lw\]

\[A = \text{6 units}^2\]

\[A = 3 \cdot 2 \text{ units}^2\]

\[A = l \cdot w\]
<table>
<thead>
<tr>
<th>Plane Figure</th>
<th>Drawing</th>
<th>Perimeter/Circumference</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triangle</td>
<td><img src="image" alt="Triangle" /></td>
<td>( P = a + b + c )</td>
<td>( A = \frac{1}{2} bh )</td>
</tr>
<tr>
<td>Parallelogram</td>
<td><img src="image" alt="Parallelogram" /></td>
<td>( P = a + b + c + d )</td>
<td>( A = bh )</td>
</tr>
<tr>
<td>Rectangle</td>
<td><img src="image" alt="Rectangle" /></td>
<td>( P = 2l + 2w )</td>
<td>( A = lw )</td>
</tr>
<tr>
<td>Rhombus</td>
<td><img src="image" alt="Rhombus" /></td>
<td>( P = 4s )</td>
<td>( A = bh )</td>
</tr>
<tr>
<td>Square</td>
<td><img src="image" alt="Square" /></td>
<td>( P = 4s )</td>
<td>( A = s^2 )</td>
</tr>
<tr>
<td>Trapezoid</td>
<td><img src="image" alt="Trapezoid" /></td>
<td>( P = a + b + c + d )</td>
<td>( A = \frac{1}{2} h(b_1 + b_2) )</td>
</tr>
<tr>
<td>Circle</td>
<td><img src="image" alt="Circle" /></td>
<td>( C = \pi d ) or ( 2\pi r )</td>
<td>( A = \pi r^2 )</td>
</tr>
</tbody>
</table>
### Basic Concepts:

<table>
<thead>
<tr>
<th>Description</th>
<th>Drawing</th>
</tr>
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<tbody>
<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Parts of Lines:

<table>
<thead>
<tr>
<th>Description</th>
<th>Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Definition of an Angle:** _____________________________
### Types of Angles:

<table>
<thead>
<tr>
<th>Description</th>
<th>Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
</tbody>
</table>

### Pairs of Angles:

<table>
<thead>
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<th>Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>
When two lines intersect, pairs of _____________ angles are formed.

**Types of Intersecting Lines in a Plane:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Vertical angles have the _____________ measure.

If two parallel lines are cut by a third line (called the _____________), various pairs of angles are formed.
Angles formed by Parallel Lines cut by a Transversal:

<table>
<thead>
<tr>
<th>Description</th>
<th>Drawing</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td><img src="image1" alt="Drawing 1" /></td>
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<tr>
<td>2.</td>
<td><img src="image2" alt="Drawing 2" /></td>
</tr>
<tr>
<td>3.</td>
<td><img src="image3" alt="Drawing 3" /></td>
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</tbody>
</table>
## Polygons

<table>
<thead>
<tr>
<th>Polygon</th>
<th>Number of Sides</th>
<th>Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triangle</td>
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<td></td>
</tr>
<tr>
<td>Quadrilateral</td>
<td></td>
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<tr>
<td>Pentagon</td>
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<tr>
<td>Hexagon</td>
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<tr>
<td>Heptagon</td>
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<tr>
<td>Octagon</td>
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<tr>
<td>Nonagon</td>
<td></td>
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<tr>
<td>Decagon</td>
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</tbody>
</table>
Geometry Definitions and Facts

A ________________________ is defined as a set of points in a plane equidistant from a given point called the center.

A ________________________ is a line segment connecting any two points of the circle passing through the center of the circle.

A ________________________ is a line segment connecting the center of the circle with any point on the circle.

A ________________________ is equal to two radii ( \( d = \) ).

<table>
<thead>
<tr>
<th>Classification of Triangles by Sides</th>
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<table>
<thead>
<tr>
<th>Classification of Triangles by Angles</th>
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</tbody>
</table>

45
The sum of the measures of the interior angles of a triangle is _______________ degrees.

If the two nonparallel sides of a trapezoid are equal in length, it is called an
______________________________.

If all the angles of a parallelogram measure 90°, it is called a
______________________________.

If all the sides of a parallelogram are the same length, it is called a
______________________________.

If the sides of a parallelogram are the same length and the angles measure 90°, it is called a
______________________________.
Plane Figures

The distance around a plane figure is called the __________________________ or _________________.

The number of square units in the interior of a plane figure is called the ________________.

<table>
<thead>
<tr>
<th>Plane Figure</th>
<th>Drawing</th>
<th>Perimeter or Circumference</th>
<th>Area</th>
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</thead>
<tbody>
<tr>
<td>Triangle</td>
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<td></td>
<td></td>
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<tr>
<td>Parallelogram</td>
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<tr>
<td>Rectangle</td>
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<td>Rhombus</td>
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<tr>
<td>Square</td>
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<tr>
<td>Trapezoid</td>
<td></td>
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<tr>
<td>Circle</td>
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</tbody>
</table>
Solid Figures

The number of cubic units in the interior of a solid figure is called the _________________.

<table>
<thead>
<tr>
<th>Solid Figure</th>
<th>Drawing</th>
<th>Volume Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectangular Solid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cube</td>
<td></td>
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<tr>
<td>Sphere</td>
<td></td>
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<tr>
<td>Circular Cylinder</td>
<td></td>
<td></td>
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<tr>
<td>Cone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Square-Based Pyramid</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Introduction to Geometry Worksheet I

1. Given \( \angle LOM = 83^\circ \) and \( \angle LON = 142^\circ \), find the measure of \( \angle MON \).

2. Given \( \angle LOM = 42^\circ \) and \( \angle LON = 93^\circ \), find the measure of \( \angle MON \).

Find the measure of \( \angle x \).

3. Given \( \angle LON \) is a right angle, find the measure of \( \angle x \).

4. Given \( \angle LON \) is a right angle, find the measure of \( \angle x \).

5. Given \( \angle LON \) is a right angle, find the measure of \( \angle x \).

6. Given \( \angle LON \) is a right angle, find the measure of \( \angle x \).

7. Given \( \angle LON \) is a right angle, find the measure of \( \angle x \).

8. Given \( \angle LON \) is a right angle, find the measure of \( \angle x \).
Find the measure of $\angle x$.

9.

11.

Find $x$.

13.

15.

17.

10.

12.

14.

16.

18.
Find the measure of $\angle x$.

19. $\angle x = 82^\circ$

20. $x = 129^\circ$

Find $x$.

21. $5x + 4x + 20^\circ = 180^\circ$

22. $2x + 36^\circ = 180^\circ$

Given $l_1 \parallel l_2$, find the measures of $\angle a$ and $\angle b$.

23. $\angle t = 42^\circ$

24. $\angle t = 136^\circ$

25. $\angle t = 24^\circ$

26. $\angle a = 126^\circ$

Given $l_1 \parallel l_2$, find $x$.

27. $3x + x = 180^\circ$

28. $3x + 6x = 180^\circ$
Find the measures of $\angle x$ and $\angle y$.

**ANSWERS**

1. 59°  
2. 38°  
3. 112°  
4. 20°  
5. 20°  
6. 15°  
7. 112°  
8. 36°  
9. 139°  
10. 98°  
11. 45°  
12. 112°  
13. 135°  
14. 36°  
15. 20°  
16. 36°  
17. 76°  
18. 126°  
19. 95°  
20. 40°  
21. $\angle a = 42°$, $\angle b = 42°$  
22. $\angle a = 156°$, $\angle b = 24°$  
23. $\angle x = 121°$, $\angle y = 76°$  
24. $\angle x = 36°$, $\angle y = 126°$
Geometry Worksheet II

Find the complement of the following angles:  
1. $34^\circ$  
2. $72^\circ$

Find the supplement of the following angles:  
3. $153^\circ$  
4. $48^\circ$

Use the given line for problems #5 - #10:

5. If $AB = 14$, $BC = 5$, and $AD = 26$, find the length of $CD$.
6. If $AB = 18$, $BC = 2$, and $AD = 30$, find the length of $CD$.
7. If $AD = 40$, $CD = 12$, find the length of $AC$.
8. If $BC = 6$, $CD = 8$, and $AD = 18$, find the length of $AB$.
9. If $AB = 15$, and $BD$ is twice the length of $AB$, find the length of $AD$.
10. If $AC = 20$ and $CD$ is half the length of $AC$, find the length of $AD$.

Given the angle for problems #11 and #12:

11. Given $\angle LOM = 54^\circ$ and $\angle LON = 108^\circ$, find the measure of $\angle MON$.
12. Given $\angle LOM = 68^\circ$ and $\angle MON = 42^\circ$, find the measure of $\angle LON$.

Find the measure of $x$ for problems #13 and #14:

13. 
14. 

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Given that $\angle LON$ is a right angle, find the measure of $\angle x$ for problems #15 - #18.

15. 

16. 

17. 

18. 

Find the measure of $\angle x$ for problems #19 - #32.

19. 

20. 

21. 

22. 

23. 

24. 

25. 

26.
27. Find the measure of \( \angle x \).

29. Given that \( l_1 \parallel l_2 \), find the measures of angles \( a \) and \( b \).

31. \( 5x \) \( 3x + 34^\circ \)

33. \( l_1 \parallel l_2 \) with \( \angle a = 132^\circ \)

35. \( l_1 \parallel l_2 \) with \( \angle a = 58^\circ \)

37. \( 3x \) \( 2x \)
Given that \( l_1 \parallel l_2 \), find \( x \).

37.

\[
\begin{align*}
&l_1 \\
\quad &\quad 3x \\
&\quad \quad 7x \\
&\quad l_2
\end{align*}
\]

38.

\[
\begin{align*}
&l_1 \\
\quad &\quad 2x \\
&\quad \quad 4x \\
&\quad l_2
\end{align*}
\]

39.

\[
\begin{align*}
&l_1 \\
\quad &\quad 6x \\
&\quad \quad x + 40^\circ \\
&\quad l_2
\end{align*}
\]

40.

\[
\begin{align*}
&l_1 \\
\quad &\quad x + 20^\circ \\
&\quad \quad 3x \\
&\quad l_2
\end{align*}
\]

41. One angle in a triangle is a right angle, and one angle is equal to 25°. What is the measure of the third angle?

42. A triangle has a 55° and a right angle. Find the measure of the third angle.

43. Two angles of a triangle measure 40° and 100°. Find the measure of the third angle.

44. A triangle has a 15° angle and a 70° angle. What is the measure of the third angle?
45. Given that $\angle a = 105^\circ$ and $\angle b = 65^\circ$, find the measures of angles $x$ and $y$.

46. Given that $\angle a = 140^\circ$ and $\angle b = 120^\circ$, find the measures of angles $x$ and $y$.

47. Given that $\angle y = 150^\circ$, find the measures of angles $a$ and $b$.

48. Given that $\angle y = 125^\circ$, find the measures of angles $a$ and $b$.

**ANSWERS**

1. $56^\circ$  
2. $27^\circ$  
3. 7  
4. $45^\circ$  
5. $115^\circ$  
6. $120^\circ$  
7. $18^\circ$  
8. $29^\circ$  
9. $142^\circ$  
10. $115^\circ$  
11. $54^\circ$  
12. $120^\circ$  
13. $18^\circ$  
14. $29^\circ$  
15. $142^\circ$  
16. $115^\circ$  
17. $108^\circ$  
18. $31^\circ$  
19. $142^\circ$  
20. $115^\circ$  
21. $33. a = 48^\circ, b = 132^\circ$  
22. $35. a = 58^\circ, b = 122^\circ$  
23. $37. 18^\circ$  
24. $39. 20^\circ$  
25. $41. 65^\circ$  
26. $43. 40^\circ$  
27. $45. x = 140^\circ, y = 115^\circ$  
28. $47. a = 30^\circ, b = 60^\circ$
SUPPLEMENTARY WORKSHEETS
Worksheet on Whole Number Inequalities

I. Label the number line appropriately. Plot the numbers. Circle the phrase to complete the sentence and write the sentence using mathematical notation.

Example: 12, 6

\[12 \text{ is less than } 6\]

\[12 > 6\]

1. 5, 15

\[5 \text{ is less than } 15\]

2. 7, 3

\[7 \text{ is less than } 3\]

\[7 < 3\]

3. 24, 15

\[24 \text{ is less than } 15\]

4. 0, 5

\[0 \text{ is less than } 5\]

\[0 < 5\]

5. 54, 62

\[54 \text{ is less than } 62\]

6. 101, 106

\[101 \text{ is less than } 106\]

\[101 < 106\]

7. 27, 9

\[27 \text{ is less than } 9\]

8. 99, 77

\[99 \text{ is less than } 77\]

\[99 < 77\]

II. Label the number line appropriately. Plot the numbers. Circle the phrase to complete the sentence and write the sentence using mathematical notation. Then, if possible, write a single mathematical sentence.

Example: 7, 3, 4

\[7 \text{ is less than } 3 \text{ and } 3 \text{ is less than } 4\]

\[7 < 3 \text{ and } 3 < 4\]

\[3 < 4 < 7\]
9. 3, 7, 5
3 is less than is greater than 7 and 7 is less than is greater than 5

10. 15, 12, 9
15 is less than is greater than 12 and 12 is less than is greater than 9

11. 33, 35, 39
33 is less than is greater than 35 and 35 is less than is greater than 39

12. 44, 41, 46
44 is less than is greater than 41 and 41 is less than is greater than 46

ANSWERS

1. is less than; 5 < 15  3. is greater than; 24 > 15  5. is less than; 54 < 62  7. is greater than; 27 > 9
9. is less than; is greater than; 3 < 7; 7 > 5; 3 < 5 < 7  11. is less than; is less than; 33 < 35; 35 < 39;
33 < 35 < 39
Worksheet on Properties

I. Rewrite each sum using the commutative property.

1. $9 + 4$
2. $11 + 6$
3. $2 + 13$
4. $7 + 8$

II. Rewrite each sum using the associative property

5. $3 + (2 + 9)$
6. $(5 + 3) + 8$
7. $(4 + 1) + 10$
8. $9 + (2 + 6)$

III. Rewrite each product using the commutative property.

9. $6 \cdot 9$
10. $2 \cdot 13$
11. $3 \cdot 89$
12. $2 \cdot 32$

IV. Rewrite each product using the associative property.

13. $3(2 \cdot 8)$
14. $(4 \cdot 8) \cdot 10$
15. $(4 \cdot 1) \cdot 15$
16. $5(7 \cdot 12)$

V. Name the property using Property of 0, Property of 1, Commutative Property, Associative Property, Distributive Property.

17. $7 + 0 = 7$

18. $7 + (2 + 3) = (7 + 2) + 3$

19. $7 \cdot 0 = 0$

20. $7(2 + 3) = 7 \cdot 2 + 7 \cdot 3$

21. $7 \cdot 3 = 3 \cdot 7$
22. \(7(2\cdot3) = (7\cdot2)3\)  

23. \(7\cdot1 = 7\)  

24. \(7 - 0 = 7\)  

25. \(7 + (2 + 3) = (2 + 3) + 7\)  

\textbf{ANSWERS}  

1. \(4 + 9\)  
3. \(13 + 2\)  
5. \((3 + 2) + 9\)  
7. \(4 + (1 + 10)\)  
9. \(9 \cdot 6\)  
11. \(89 \cdot 32\)  
13. \((3 \cdot 2) \cdot 8\)  
15. \(4 \cdot (1 \cdot 15)\)  
17. Property of 0  
19. Property of 0  
21. Commutative  
23. Property of 1  
25. Commutative
Whole Numbers Order of Operations Worksheet

All work must be shown for credit.

1. $5 \cdot 2 + 3$
2. $8 \div 2 - 3$
3. $3^2 + 4$
4. $3(8 - 6) - 1^2$
5. $16 - (10 + 5) \div 3$
6. $2^3 + 8 - 6$
7. $5 \cdot 2^2 + 3^2$
8. $5 - (3 - 1) + 1$
9. $18 - 4^2 \div 8$
10. $2^3 + 3(5 - 2)^2$
11. $3^3 - 2(3)$
12. $24 - 2(1 + 2)^3$
13. $5(7 - 4) - 1$
14. $20 - (2 + 4) \div 3$
15. $23 + 1^4 - 4 \cdot 5 \div 4 - 1$
16. $20 - 10 \div 5$
17. $14 - 2 \cdot 6$
18. $5^2 - 5 + 2$
19. $15 - (9 + 3) \div 6$
20. $4(13 + 2) \div 5$
21. $20 - 2^3 - 4$
22. $12 - 8 \div 2$
23. $24 \div 2 - 3 \cdot 4$
24. $5^2 + 4(15 \div 3)$
25. \((4 - 1)^2 + 2^3\)
26. \(20 - (3 + 1)^3\)
27. \(6(7 - 5)^3 - 20\)

28. \(18 - (16 - 2) \div 7\)
29. \(11 + 2 - 3 \cdot 4 \div 3\)
30. \(4(20 - 14) \div 8 + 1\)

31. \(\frac{5^2 + 3}{3^2 - 2}\)
32. \(\frac{9 - (4 - 3)^4}{6 - 3 + 1}\)
33. \(\frac{4(9 - 6) + 4}{3^2 - 1}\)

34. \(\frac{5 - [2^3 - (4 + 2)]}{5 - 2^2}\)
35. \(\frac{4[20 \div (3 + 2)]}{2^3 - 4}\)
36. \(\frac{2^3 + 4 \cdot 3}{3 \cdot 2 + 4}\)

37. \(\frac{3(8 + 2)}{4^2 - 1}\)
38. \(\frac{2[40 \div (2 + 6)]}{8 - 2 + 4}\)
39. \(5^2 - [(12 + 3) \div 5]\)

40. \(8 \cdot 2 + [10 \div (7 - 2)]\)

ANSWERS
1. 13 3. 13 5. 11 7. 29 9. 16 11. 21 13. 14 15. 18 17. 2 19. 13 21. 8 23. 0
25. 17 27. 28 29. 9 31. 4 33. 2 35. 4 37. 2 39. 22
Integer Order of Operations Worksheet

All work must be shown for credit.

1. \( 6 - 15 \div 3 \)
2. \( -10 \div 2 + 1 \)
3. \( 3(4 - 7) - (-6) \)

4. \( 1 - (9 - 4) \div 5 \)
5. \( 7 - (-2)^3 \)
6. \( (-2)^3 - (-5) \)

7. \( 2(-6 + 2) \div 4 \)
8. \( 7 - 3(4 - 5) \)
9. \( 8 - (-4)^2 - 5 \)

10. \( -7 + 1^2 + 2 \)
11. \( -3^3 - 6(-2) - 2 \)
12. \( 5 \cdot 3 - (-3)^3 \)

13. \( -8(2 - 6) \div 2 \)
14. \( 4(6 - 9) \div 6 \)
15. \( -8(2 - 5) \div (-4) \)

16. \( 8 - 3 \cdot 2 - 33 \div 11 \)
17. \( 9 - 3(6 \div 2) \)
18. \( (-3)^2 - (-2)^2 - 1 \)

19. \( 7 \cdot 2 - 5 \cdot 3 \)
20. \( 20 \div 4 - 14 \div 2 \)
21. \( 2^3 - 6 \cdot 2 + 3 \)

22. \( (-3)^2 \cdot (5 - 7)^2 - (-9) \div 3 \)
23. \( 1^3 - 6 \div (-3) \)
24. \( 4 \cdot 5 - 10 - 2(1 - 2) + 5 \)
25. \((-1) \cdot (2 - 6)^2 + 8 + 8 - 3 \cdot 4\)  
26. \(5 - (-3)^2 - 6\)  
27. \(10 \div 5 - (-2)^2\)

28. \(20 - 2 \cdot 7 + 1 - (-3) + 10\)

Given \(w = -1, \ x = 6, \ y = 3,\) and \(z = -2;\) evaluate the following:

29. \(4w + 2y\)  
30. \(x - 3(-z)\)  
31. \(xy + z\)

32. \(9z \div x\)  
33. \(x^2 - y^2\)  
34. \(y^2 - z^2\)

35. \(\frac{2x + y}{z + w}\)  
36. \(\frac{3x - z}{-w}\)  
37. \(\frac{x + w}{y - z}\)

38. \(\frac{xy}{z} \div w\)  
39. \((-x + z)^2 \div 8\)  
40. \((y + z)^2 + (w - x)^2\)

ANSWERS

1. 1  
3. -3  
5. 15  
7. -2  
9. -13  
11. -17  
13. 16  
15. -6  
17. 0  
19. -1  
21. -1  
23. 3  
25. -6  
27. -2  
29. 2  
31. -9  
33. 27  
35. -5  
37. 1  
39. 8  

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Solving Linear Equations Worksheet I
(Sections 3.1 – 3.4)

Simplify. Combine like terms.

1. \(12y - 18y\)  
2. \(-4(y + 5)\)  
3. \(3x + 6y - 9x + 4\)  
4. \(6(x - 9) + 10 - 3x\)

5. Is 4 a solution of \(5(2 - x) = -10\)? Show work to justify your answer.

Solve and check the following equations. Show all steps.

6. \(4x + 20 = 0\)  
7. \(5x - 3 = 2x - 27\)  
8. \(6x - 8 = 2x + 16\)

9. \(12 - 3x = 22 + 2x\)  
10. \(x + 7x - 12 = -20\)  
11. \(7x + 4 - 13x = -1 + 23\)

12. \(18 = 2x - 14\)  
13. \(4y - 8y = 4 - 32\)  
14. \(4y - 19 = -6y + 11\)

15. \(7x + 5 = 12x - 10\)  
16. \(26 = 24 - x\)  
17. \(2(6x - 7) = 10\)

18. \(19 - 3x = 14 + 2x\)  
19. \(2(7 + 5y) - 3y = -35\)  
20. \(14 + 4(x - 5) = 6 - 2x\)

**ANSWERS**

1. \(-6y\)  
3. \(-6x + 6y + 4\)  
5. yes  
7. \(-8\)  
9. \(-2\)  
11. \(-3\)  
13. \(\{7\}\)  
15. \(\{3\}\)  
17. \(\{2\}\)  
19. \(\{-7\}\)
Solving Linear Equations Worksheet II  
(Section 3.4)

Solve for the variable. All work must be shown and all problems must be checked.

1. \[4x + 3 = 2x + 9\]  
2. \[6z + 5 = 3z + 20\]  
3. \[2n - 3 = 5n - 18\]

4. \[4t - 7 = 10t - 25\]  
5. \[3z + 5 = 19 - 4z\]  
6. \[2m + 3 = 23 + m\]

7. \[8 - 3m = 8m - 14\]  
8. \[12 - 5y = 3y - 12\]  
9. \[5n - 1 + 2n = 4n + 8\]

10. \[4t - 8 + 12t = 3 - 4t - 11\]  
11. \[2a + 3 - 9a = 3a + 33\]  
12. \[-2(4x + 1) = 22\]

13. \[5(2x + 1) - 7 = 28\]  
14. \[3(3x - 4) + 2x = 10\]  
15. \[4(3x + 1) - 5x = 25\]

16. \[6 + 3(3x - 3) = 24\]  
17. \[3(2x - 5) = 4x + 1\]  
18. \[-3(2x - 5) = 21\]

19. \[7x - 3(x - 4) = 20\]  
20. \[2 - 3(5x + 2) = 2(3 - 5x)\]

ANSWERS

1. \{3\}  
3. \{5\}  
5. \{2\}  
7. \{2\}  
9. \{3\}  
11. \{-3\}  
13. \{3\}  
15. \{3\}  
17. \{8\}  
19. \{2\}
Solving Linear Equations Worksheet III
(Section 3.4)

Solve showing all steps. Check the odds.

1. \(20 = x - 8\)  
2. \(x + 10 = -2 + 5\)

3. \(10 - x = 19\)  
4. \(-10x + 4 + 9x = 1\)

5. \(2y - 6y = 20\)  
6. \(3(2x - 1) = 21\)

7. \(14y - 4 = 9y + 11\)  
8. \(6x - 9x = -24\)

9. \(2x + 6 = 6x + 18\)  
10. \(-30 = -3y\)

ANSWERS

1. \{28\}  
3. \{-9\}  
5. \{-5\}  
7. \{3\}  
9. \{-3\}
CHAPTER REVIEWS AND FINAL EXAM REVIEW
Review for Chapter One Exam

Determine the place value of the digit 3 in the whole number.

1. 463,981

Write each whole number in words.

2. 4,200,091

3. 3,072

Write the whole number in standard form.

4. Last year the population of a city increased by two thousand, one hundred eight.

Write each whole number in expanded form.

5. 63,421

6. 32,501,002

Use < or > for _____ to write a true sentence.

7. 0 _____ 14

8. 37 _____ 42

The table shows the number of votes each candidate received in the last election. Use this table to answer the following question.

<table>
<thead>
<tr>
<th>Candidate</th>
<th>Votes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Olsen</td>
<td>2,078</td>
</tr>
<tr>
<td>Ms. Li</td>
<td>3,760</td>
</tr>
<tr>
<td>Mr. Barone</td>
<td>2,780</td>
</tr>
<tr>
<td>Ms. Vaporis</td>
<td>3,706</td>
</tr>
</tbody>
</table>

9. Write the number of votes received by Mr. Barone in expanded form.
Perform the indicated operation.

10. \[ \begin{array}{c}
    777 \\
    + 948
\end{array} \]

11. \[ \frac{36}{36} \]

12. \[ \frac{50}{11} \]

13. \[ \begin{array}{c}
    475 \\
    \times 4
\end{array} \]

14. \[ \begin{array}{c}
    508 \\
    \times 18
\end{array} \]

15. \[ (590)(80) \]

16. \[ \frac{45}{9} \]

17. \[ \begin{array}{c}
    885 \\
    - 44
\end{array} \]

18. \[ \frac{9}{0} \]

19. \[ 1150 \div 46 \]

20. \[ \begin{array}{c}
    6587 \\
    - 2524
\end{array} \]

21. \[ 5 \div 5255 \]

22. \[ 245,447 \div 400 \]

23. \[ \begin{array}{c}
    91 \\
    - 28
\end{array} \]

24. \[ 531 + 881 \]

Find the perimeter.

25.

26. \[ \begin{array}{c}
    596 \text{ yards} \\
    348 \text{ yards}
\end{array} \]

763 \text{ yards}
27.

Solve.

28. Last year a company had 5,846 employees. This year the number of employees increased by 1,388. How many employees does the company have now?

29. Find the product of 7 and 0.

30. Lew is installing an invisible fence in his back yard which measures 111 feet by 68 feet by 87 feet by 99 feet. How many feet of wiring are needed to enclose his yard?

31. A rectangular plot of land measures 60 feet by 170 feet. Find its area.

32. Find the sum of 31 and 32.

33. Claire is reading a 501 page book. If she has just finished reading page 285, how many more pages must she read to finish the book?
34. The textbook for a history class costs $51. There are 23 students in the class. Find the total cost of the history books for the class.

35. Find the quotient of 54 and 6.

36. A camera that sells regularly for $250 is discounted by $69 in a sale. What is the sale price?

37. Ms. Losch has a piece of rope 227 feet long that she cuts into pieces for an experiment in her first grade class. Each piece of rope is to be 9 feet long. How many 9 foot long pieces of rope can she cut from the original piece of rope?

38. Find the difference of 33 and 5.

39. Round the whole number 45,746,400 to the nearest million.

Estimate the answer by rounding each number to the nearest ten.

40. \[
\begin{array}{c}
763 \\
- 98
\end{array}
\]

Estimate the answer by rounding each number to the nearest hundred.

41. \[591 \times 304\]

42. \[
\begin{array}{c}
708 \\
519 \\
291 \\
637 \\
+ 718
\end{array}
\]
Solve each problem by estimating.

43. The Pan family took a trip and traveled 55, 165, 649, 639, 798, and 360 miles on 6 consecutive days. Round each distance to the nearest hundred to estimate the distance they traveled.

44. Andy wants to buy a refrigerator for $799, a stove for $459, and a dishwasher for $249. Round each cost to the nearest hundred to estimate the total cost.

Use the distributive property to rewrite each expression.

45. $8(5+3)$

46. $9(8+2)$

Find the area of each rectangle.

47. $30 \text{ m} \times 10 \text{ m}$

48. $3 \text{ ft.} \times 6 \text{ ft.}$

49. $9 \text{ mi.} \times 9 \text{ mi.}$
Find the average of each list of numbers.

50. 25, 29, 26, 30, 57, 24, 26
51. 269, 695, 660, 716

Write using exponential notation.

52. $18 \cdot 18 \cdot 18 \cdot 18$
53. $8 \cdot 8 \cdot 8 \cdot 8$

54. Find the square of 15.
55. Find the cube of 4.

Evaluate.

56. $9^3$
57. $12^2$

Simplify.

58. $17 + 26 \cdot 30$
59. $0 \div 7 + 4 \cdot 8$
60. $19 \cdot 6 + 10 \cdot 12$

61. \{ [57 – 2 \cdot 4] – [66 \div (1 + 2) ] \} \cdot 6$
62. $7 [5 + 6(2^2) ]$

63. List the digits
64. List the set of whole numbers

ANSWERS

1. thousands 2. four million, two hundred thousand, ninety-one 3. three thousand, seventy-two
4. 2,108 5. 60,000 + 3,000 + 400 + 20 + 1 6. 30,000,000 + 2,000,000 + 500,000 + 1,000 + 2
7. 8. 9. 2,000 + 700 + 80 10. 1,725 11. 1 12. 39 13. 1,900 14. 9,144 15. 47,200 16. 5
17. 841 18. undefined 19. 25 20. 4,063 21. 1,051 22. 613 23. 63 24. 1,412
25. 575 ft. 26. 1,707 yds. 27. 354 in. 28. 7,234 employees 29. 0 30. 365 ft. 31. 10,200 ft²
32. 63 33. 216 pages 34. $1,173 35. 9 36. $181 37. 25 pieces of rope 38. 28
39. 46,000,000 40. 660 41. 180,000 42. 2,800 43. 2,700 miles 44. $1,500 45. 8 \cdot 5 + 8 \cdot 3
46. 9 \cdot 8 + 9 + 2 47. 300 m² 48. 18 ft² 49. 81 mi² 50. 31 51. 585 52. 18² 53. 8³
54. 225 55. 64 56. 729 57. 144 58. 797 59. 32 60. 234 61. 162 62. 203
63. 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 64. \{0, 1, 2, 3, \ldots \}
Review for Chapter Two Exam

1. List the integers.

Represent each quantity by an integer.

2. a climb of 128 feet down into a subterranean cave

3. finding 58 cents

Graph the numbers on the number line.

4. 0, 2, 4, 6

5. –11, -9, -7, -5

6. –7, -5, -3, -1

Insert <, >, = to make the statement true.

7. 8 _____ -5

8. –76 _____ -22

9. 0 _____ -42

10. –|–17| _____ –|–34|

Simplify.

11. |–4|

12. |4|

Find the opposite of each integer.

13. 0

14. 24

Simplify.

15. –(–11)

16. –|–24|
Add the numbers using the number line.

17. \(-6 + 1\)

Perform the indicated operation.

18. \(-36 + (-45)\)  
19. \(0 \cdot (-17)\)  
20. \(-90 + (+50)\)  
21. \((-8)(-3)(4)\)  
22. \(9 + (-79)\)  
23. \(0 - (-17)\)  
24. \(11 \cdot (-17)\)  
25. \(-98 + 0\)  
26. \(-19 \cdot (-6)\)  
27. \(\frac{17}{0}\)  
28. \(\frac{60}{-3}\)  
29. \(\frac{0}{78}\)  
30. \((3)(-3)(-3)\)  
31. \(4 - (-4)\)  
32. \(-15 - 15\)  
33. \(-4 - 0 - 12 - (-13) + 1\)  
34. \(-19 - 1 + (-17)\)  
35. \(-15 + 11 - (-19) - 3\)  
36. \(-20 + 15 + (-12)\)  
37. \(7 + (-18) + 1 + (-15) + 4 + (-19)\)  
38. \(6 + 13 + (-19)\)

Evaluate \(x + y + z\) for the given replacement values.

39. \(x = -20, y = 10, \text{ and } z = -7\)  
40. \(x = -20, y = 10, \text{ and } z = -4\)

Evaluate \(x - y\) for the given replacement values.

41. \(x = 13 \text{ and } y = -27\)  
42. \(x = -23 \text{ and } y = 8\)

Evaluate each expression for the given replacement values.

43. \(\frac{x}{y}\) for \(x = -41 \text{ and } y = 0\)  
44. \(\frac{x}{y}\) for \(x = 0 \text{ and } y = -31\)  
45. \(xy\) for \(x = -7 \text{ and } y = -2\)

Evaluate each expression for \(x = -2, y = 3, z = -4\).

46. \(14 - z^2\)  
47. \((4z)(-9x - 5y)\)
Solve.

48. A deep-sea diver dives from the surface to 132 feet below the surface. She then dives down 12 more feet. Find the diver’s depth.

49. Tori has $209 in her checking account. She writes a check for $51, makes a deposit for $105, and then writes another check for $101. Find the amount left in her account. (Write the amount as an integer.)

50. In a card game, it is possible to have a negative score. If Mia’s score is 15, what is her new score if she loses 20 points?

51. A weather forecaster predicts that the temperature will drop 6 degrees each hour for the next 8 hours. If the temperature is 9 degrees before the temperature starts falling, what is the temperature after the drop?

52. Subtract 36 from –12.

53. The temperature at 5 p.m. on January 3 was -6° Fahrenheit. By 9 p.m. the temperature had risen 9 degrees. Find the temperature at 9 p.m.

54. Ben lost $475 on each of 5 consecutive days in the stock market. If he had $16,975 before his loss, how much does he have after his loss?

55. The formula for converting a temperature from Fahrenheit to Celsius is \( F = \frac{9}{5}C + 32. \) When \( C = -5° \), what does \( F \) equal?

Evaluate.

56. \((-6)^5\)  
57. \((-1)^6\)

Simplify.

58. \((28+16)(15-10)\)  
59. \(-7 \div 17 - 9 \div 7\)  
60. \(-8 + 22 \div 27 + 5\)

61. \(-|16| - |-10 - 8|\)  
62. \(-|21| - |10|\)  
63. \((-5)^2 - 9^2\)  
64. \(-2^3\)
ANSWERS

1. \{-3, -2, -1, 0, 1, 2, 3, \ldots\}  
2. -128  
3. 58  
4.  
5. -12 -11 -10 -9 -8 -7 -6 -5 -4  
6. -20 -19 -18 -17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0  

7. 8 > 5  
8. -76 < -22  
9. >  
10. >  
11. 4  
12. 4  
13. 0  
14. -24  
15. 11  
16. -24  
17. -5  
18. -81  
19. 0  
20. -40  
21. 96  
22. -70  
23. 17  
24. -187  
25. -98  
26. 114  
27. Undefined  
28. -20  
29. 0  
30. 27  
31. 8  
32. -30  
33. -2  
34. -37  
35. 12  
36. -17  
37. -40  
38. 0  
39. -17  
40. -14  
41. 40  
42. -31  
43. Undefined  
44. 0  
45. 14  
46. -2  
47. -48  
48. 144 ft. below the surface  
49. 162 dollars  
50. -5 points  
51. -39°  
52. -48  
53. 3°  
54. $14,600  
55. 23°  
56. -7776  
57. 1  
58. 220  
59. -182  
60. 591  
61. -34  
62. -31  
63. -56  
64. -8
Review for Chapter Three Exam

Simplify each expression.
1. $-6b + 3b$
2. $-13y - 8x - 5x$
3. $-5y + 6 - 5 + 2 + y - 3$
4. $-(-6 + 3y)$
5. $-9(7n + 7)$
6. $3(10z)$
7. $-(8xz - 5) + 9(5xz + 7)$
8. $-(-6m) + 3 + (-3n)$
9. $6 + 5(17 - 3m)$

Find the perimeter or area of each figure as indicated.

10. Find the perimeter of the trapezoid.

```
\begin{figure}
\centering
\includegraphics[width=0.5\textwidth]{trapezoid.png}
\caption{Diagram of the trapezoid with measurements 23y m, 13y m, 13y m, 29y m.}
\end{figure}
```

11. Find the perimeter.

```
\begin{figure}
\centering
\includegraphics[width=0.5\textwidth]{rectangle.png}
\caption{Diagram of the rectangle with measurements 5x + 4 m, 6x m, 9x - 6 m, 5x m, 3 m.}
\end{figure}
```

12. Find the perimeter of the regular hexagon.

```
\begin{figure}
\centering
\includegraphics[width=0.5\textwidth]{hexagon.png}
\caption{Diagram of the hexagon with each side: $7x + 9$ feet.}
\end{figure}
```
13. Find the area of the square.

Each side: 
(21x) centimeters

Decide whether the given number is a solution of the given equation.

14. \( p + 3 = 9; \) 6

15. \( 8y + 7(y - 4) = 47; \) 5

Solve each equation.

16. \( 24 = f - 24 \)

17. \(-60 = -4n \)

18. \( a - 2 = 14 \)

19. \(-10 = b - 16 \)

20. \( 16 = -30 + n \)

21. \(-9b + 4 + 7b = -3b + 9 \)

22. \(-2x = -12 \)

23. \(5r + 9 = 39 \)

24. \(-9m - 12 = -8m - 3 \)

25. \(3(2z - 4) = 5(z + 5) \)

26. \(-16 = 4k \)

27. \(11 = 6x - 7 \)

28. \(14 - v = 28 \)

29. \(186 = 14x + 18 \)

30. \(6p + 14 = 5p + 13 \)

31. \(-7a + 3 + 8a = 11 - 22 \)

32. \(8m + 4 = 9m - 3 \)

33. \(9x + 3x = -96 \)

34. \(3(y + 2) = 4(y - 3) \)
Translate each phrase into an algebraic expression.

35. The product of $-27$ and the sum of a number and $15$.

36. The quotient of $61$ and the product of a number and $-5$.

37. Eight times the sum of a number and $-15$.

38. The product of $11$ and a number, added to $10$.

Write each sentence as an equation.

39. The difference of negative $33$ and $17$ yields negative $50$.

40. The sum of $-42$ and $35$ gives $-7$.

41. Five times the difference of $-15$ and $6$ yields $-105$.

ANSWERS

1. $-3b$
2. $-13y - 13x$
3. $-4y$
4. $6 - 3y$
5. $-63n - 63$
6. $30z$
7. $37xz + 68$
8. $6m + (-3n) + 3$
9. $91 - 15m$
10. $78y$ meters
11. $26x + 1$ meters
12. $42x + 54$ feet
13. $441x^2\text{ sq. cm}$
14. Yes
15. Yes
16. $48$
17. $15$
18. $16$
19. $6$
20. $46$
21. $5$
22. $6$
23. $6$
24. $-9$
25. $37$
26. $-4$
27. $3$
28. $-14$
29. $12$
30. $-1$
31. $-14$
32. $7$
33. $-8$
34. $18$
35. $-27(x + 15)$
36. $\frac{61}{-5x}$
37. $8(x + (-15))$
38. $10 + 11x$
39. $-33 - 17 = -50$
40. $-42 + 35 = -7$
41. $5(-15 - 6) = -105$
Review for Chapter Four Exam

Identify the numerator and the denominator of each fraction.
1. \( \frac{7v}{11} \)  
2. \( \frac{3}{7} \)

Write a fraction to represent the shaded area of each figure.
3.  
4.  

Represent the shaded area in each figure group with an improper fraction or mixed number.
5.  
6.  
7.  
8.  

Write each fraction.
9. Of the 209 students at a college, 29 are sophomores. What fraction of the students are sophomores?
10. Of the 188 students at a private school, 57 are seniors. What fraction of the students are NOT seniors?

Write the mixed number as an improper fraction.
11. \( \frac{73}{7} \)  
12. \( \frac{67}{8} \)  
13. \( \frac{251}{7} \)

Write the improper fraction as a mixed or whole number.
14. \( \frac{28}{3} \)  
15. \( \frac{41}{5} \)
Graph each fraction on the number line.

16. $\frac{5}{8}$

17. $\frac{8}{5}$

Write each fraction as an equivalent fraction with the given denominator.

18. $\frac{1}{5}$; denominator of $15x$

19. $\frac{11z}{12}$; denominator of $108$

20. $\frac{1}{9}$; denominator of $72$

21. $\frac{10}{8r}$; denominator of $24r$

Simplify.

22. $\frac{25}{25}$

23. $\frac{-32}{1}$

24. $\frac{19}{-19}$

25. $\frac{-29}{29}$

26. $\frac{-36}{0}$

27. $\frac{-37}{-37}$

28. $\frac{0}{-11}$

29. $\frac{30}{40}$

30. $\frac{195}{210}$

31. $\frac{128}{131}$

32. $\frac{20k^3}{5k}$

33. $\frac{64p}{56p}$

34. $\frac{42rs^2t}{30r^3s^2t}$

Write the prime factorization of each number.

35. 684

36. 66

37. 395

Find the LCD of each list of fractions.

38. $\frac{4}{15}$, $\frac{5}{6}$

39. $\frac{5}{9}$, $\frac{9}{4}$

Write each fraction in simplest form.

40. A company employs 468,000 employees worldwide. About 28,800 employees work in the United States. What fraction of the employees do NOT work in the United States?

41. There are 12,600 students at a university. If 7,200 are males, what fraction of the students are males?

42. A company employs 432,000 employees worldwide. About 21,600 employees work in the United States. What fraction of the employees work in the United States?
Perform the indicated operation(s). Write the answer in simplest form.

43. \(\frac{2z^3}{3} \div \frac{9}{z^2}\)
44. \(\frac{3}{8} \div \frac{1}{7}\)
45. \(\frac{5}{8} + 9\)
46. \((-\frac{5}{6}) \div \frac{1}{5}\)

47. \((\frac{1}{5})^3\)
48. \(-\frac{9a^3}{7} + 18a^3\)
49. \(\frac{6x}{11} + \frac{4x}{19}\)
50. \(\frac{6}{7} \div \left(\frac{28}{5} \div \frac{6}{98}\right)\)

51. \(\frac{7}{90} - \frac{1}{80}\)
52. \(\frac{3}{4} \div \frac{9}{10}\)
53. \(\frac{13}{15} \div \frac{2}{5}\)
54. \(\frac{18}{5} \div \frac{6}{10}\)

55. \(\frac{8}{20x} - \frac{17}{20x}\)
56. \(\frac{5}{13x} + \frac{2}{13x}\)
57. \(\frac{5}{21} - \frac{4}{21}\)
58. \(\frac{5}{9} + \frac{1}{13}\)

59. \(\frac{2}{5} + \frac{3}{25}\)
60. \(x - \frac{14}{3}\)
61. \(\frac{12m}{13} + \frac{8}{11}\)
62. \(-\frac{7}{19} + \frac{7}{19}\)

63. \(\frac{5}{2} - \left(-\frac{5}{8}\right)\)
64. \(\left(\frac{2}{3} \div \frac{1}{2}\right) + \left(\frac{1}{2} \div \frac{3}{4}\right)\)
65. \(\frac{4}{3} + \left(\frac{5}{3}\right)^2 - \frac{3}{8}\)
66. \(8 \div \left(\frac{3}{14}\right)\)

67. \(1 \frac{4}{5} \div \frac{1}{6}\)
68. \(5 \frac{2}{7} \div 1 \frac{2}{5}\)
69. \(12 \frac{1}{2} + 20 \frac{1}{9} + \frac{4}{9}\)
70. \(15 \frac{5}{16} - 6 \frac{3}{8}\)

71. Find the quotient of \(\frac{3}{5}\) and \(\frac{8}{15}\).
72. Find the difference in \(\frac{2}{3}\) and \(\frac{4}{5}\).

73. Find the sum of \(\frac{1}{5}\) and \(\frac{1}{5}\).
74. Find the product of \(\frac{1}{5}\) and \(\frac{1}{5}\).
Evaluate each expression for the given values. Write the answer in simplest form.

75. \( x + y; \ x = \frac{11}{4} \) and \( y = \frac{77}{4} \)

76. \( xy; \ x = \frac{9}{7} \) and \( y = \frac{7}{45} \)

77. \( x + y; \ x = \frac{5}{11} \) and \( y = \frac{2}{11} \)

78. \( x - y; \ x = \frac{4}{5} \) and \( y = \frac{1}{2} \)

79. \( x + y; \ x = \frac{8}{15} \) and \( y = \frac{12}{5} \)

80. \( x + y; \ x = -\frac{7}{15} \) and \( y = \frac{1}{10} \)

81. \( 2x - y; \ x = \frac{5}{8} \) and \( y = -\frac{5}{6} \)

82. \( \frac{x}{y}; \ x = -\frac{1}{3} \) and \( y = -\frac{1}{6} \)

Solve. Write the answer in simplest form.

83. How many \( \frac{5}{11} \) pound boxes of cereal can be made from 9,185 pounds of cereal?

84. Find the area of the rectangle.

\[
\begin{array}{c}
A \\
B
\end{array}
\]

\( A = \frac{4}{9} \) foot, \( B = \frac{1}{2} \) foot

85. Find the perimeter of the scalene triangle, a triangle with all three sides a different length.
86. The total length of a bicycle race is \( \frac{7}{10} \) of a mile. Sunee has completed \( \frac{3}{5} \) of a mile. How much does she have left to complete?

87. The circle graph shows the fraction of books read by grades one through five. What fraction of books was NOT read by the fourth and first grades?

88. Lee read \( \frac{7}{10} \) of a book one week, \( \frac{4}{15} \) the next week, and \( \frac{1}{95} \) the third week. How much of the book was read?

89. Find the perimeter of the triangle.

\[
\text{Perimeter} = 3 \text{ feet} + 10\frac{1}{4} \text{ feet} + 12\frac{1}{9} \text{ feet}
\]

90. Find the perimeter of the square.

\[
\text{Perimeter} = 9\frac{9}{10} \text{ in} + 9\frac{9}{10} \text{ in} + 9\frac{9}{10} \text{ in} + 9\frac{9}{10} \text{ in}
\]

Determine whether the given replacement value is a solution of the given equation.

91. Is \( \frac{2}{45} \) a solution for \( 5x = \frac{45}{9} \)?

Solve. Write the answer in simplest form.

92. \( x - \frac{7}{9} = -\frac{2}{3} \)

93. \( x + \frac{1}{10} = \frac{9}{10} \)
ANSWERS

1. numerator is 7v, denominator is 11  
2. numerator is 3, denominator is 7  
3. \(\frac{5}{8}\)  
4. \(\frac{3}{4}\)  
5. \(\frac{5}{4}\) or \(\frac{1}{4}\)  
6. \(\frac{5}{3}\) or \(\frac{2}{3}\)  
7. \(\frac{11}{6}\) or \(\frac{5}{6}\)  
8. \(\frac{7}{4}\) or \(\frac{3}{4}\)  
9. \(\frac{29}{209}\)  
10. \(\frac{131}{188}\)  
11. \(\frac{52}{7}\)  
12. \(\frac{55}{8}\)  
13. \(\frac{1763}{7}\)

14. \(\frac{9}{3}\)  
15. \(\frac{8}{5}\)  
16. \(\frac{1}{2}\)

17. \(\frac{3s}{15s}\)  
18. \(\frac{99z}{108}\)  
19. \(\frac{8}{72}\)  
20. \(\frac{30}{24r}\)

21. 1  
22. \(4k^2\)

23. \(-32\)  
24. \(-1\)  
25. \(-1\)  
26. undefined  
27. \(1\)  
28. \(0\)  
29. \(\frac{3}{4}\)  
30. \(\frac{13}{14}\)  
31. \(\frac{128}{131}\)  
32. \(\frac{4}{7}\)

33. \(\frac{8}{7}\)  
34. \(\frac{7}{5r^2st^2}\)  
35. \(2^2\cdot3^2\cdot19\)  
36. \(2\cdot3\cdot11\)  
37. \(5\cdot79\)  
38. \(30\)  
39. \(36\)  
40. \(\frac{61}{65}\)  
41. \(\frac{4}{7}\)

42. \(\frac{1}{20}\)  
43. \(6z\)  
44. \(\frac{3}{56}\)  
45. \(\frac{5}{8}\)  
46. \(\frac{5}{36}\)  
47. \(\frac{1}{125}\)  
48. \(-\frac{1}{14}\)  
49. \(\frac{57}{22}\)  
50. \(\frac{5}{2}\)  
51. \(\frac{56}{9}\)

52. \(\frac{3}{4}\)  
53. \(\frac{41}{45}\)  
54. \(\frac{29}{18}\)  
55. \(-\frac{9}{20x}\)  
56. \(\frac{7}{13x}\)  
57. \(\frac{1}{21}\)  
58. \(\frac{56}{117}\)  
59. \(\frac{13}{25}\)

60. \(\frac{3x-28}{6}\)  
61. \(\frac{132m+104}{143}\)  
62. \(0\)  
63. \(2\)  
64. \(1\)  
65. \(\frac{53}{72}\)  
66. \(\frac{4}{7}\)  
67. \(\frac{3}{10}\)  
68. \(\frac{38}{49}\)

69. \(\frac{33}{18}\)  
70. \(\frac{15}{16}\)  
71. \(\frac{9}{8}\)  
72. \(-\frac{2}{15}\)  
73. \(\frac{3}{5}\)  
74. \(\frac{1}{25}\)  
75. \(\frac{1}{7}\)  
76. \(\frac{1}{8}\)  
77. \(-\frac{7}{11}\)  
78. \(\frac{3}{10}\)

79. \(\frac{2}{9}\)  
80. \(-\frac{11}{30}\)  
81. \(\frac{25}{12}\)  
82. \(2\)  
83. \(20,207\)  
84. \(\frac{2}{9}\) square foot  
85. \(\frac{9}{10}\) m  
86. \(\frac{1}{10}\) mile

87. \(\frac{31}{50}\)  
88. \(\frac{557}{570}\)  
89. \(\frac{25}{36}\) feet  
90. \(\frac{39}{5}\) in  
91. no  
92. \(\{\frac{1}{9}\}\)  
93. \(\{\frac{4}{5}\}\)  
94. \(\{\frac{7}{12}\}\)

95. \(\{\frac{3}{10}\}\)  
96. \{20\}  
97. \{36\}  
98. \{-23\}  
99. \{-23\}
Review for Chapter Five Exam

Write the decimal in words.

1. 4.00927
2. 4.79

Write the decimal in numbers

3. One hundred and two-tenths
4. In his qualifying time trial, a race car driver averages a speed of one hundred seventy-three and nineteen thousandths mph.

Write the decimal as a fraction or mixed number in lowest terms.

5. 697.8102
6. 0.5

Insert <, >, or = between each pair of numbers to form a true statement.

7. 654.901 ___ 654.910
8. 223.3901 ___ 223.3109
9. 0.3 ___ 0.0631
10. 0.933 ___ 0.934
11. $\frac{65}{12}$ ___ 5.417

Round the decimal to the given place value.

12. 8.74803 (nearest thousandth)
13. 76.2 (nearest ten)
14. 29.1064 (nearest hundredth)

Round the money amount to the specified place.

15. $0.1043$ (nearest cent)
16. $99.73$ (nearest dollar)

Perform the indicated operation.

17. \[
\begin{array}{c}
264.362 \\
+ 4.626 \\
\hline 
268.988
\end{array}
\]
18. \[
\begin{array}{c}
5.91 \\
+ 2.23 \\
+ 14.76 \\
\hline 
23.20
\end{array}
\]
19. \[
0.405 \times 0.3
\]
20. \[
53.135 \div (-1,000)
\]
21. \[
8.531 - 6.479
\]
22. \[
-0.2 \div (-0.2)
\]
23. \(-7.8 - 2.7\) 
24. \(565.35 \div (-100)\) 
25. \((-5.32)(-3.86)\)

26. \(5.9 \times 0.1\) 
27. \(5.1 \times 1,000\) 
28. \(-1 \div 0.02\)

29. \((242.54)(10)\) 
30. \(8.76 \div (-12)\) 
31. \(-0.86 \div 10\)

Evaluate the given expression using the given values of the variables.

32. \(y - x + z; \ x = 7.6, \ y = 9, \ z = 0.86\) 
33. \(y \div 9; \ y = 0.882\)

34. \(x + z; \ x = 5.3, \ z = 0.73\) 
35. \(-2.7y; \ y = 4\)

36. \(-5y; \ y = -2.6\) 
37. \(8.8 \div x; \ x = 14.08\)

Determine whether the given value is a solution in the given equation.

38. Is 15.6 a solution for the equation \(28.3 - z = 12.7\)?

39. Is 21 a solution for the equation \(32.4 - y = 11.4\)?

40. Is \(-6\) a solution for \(4.5x = -27\)?

41. Is 0.06 a solution for \(6.6x = 3.96\)?

42. Is 5.589 a solution for \(\frac{x}{9} = 6.21\)?

43. Is 33.44 a solution for \(\frac{x}{3.8} = 8.8\)?

Simplify by combining like terms.

44. \(-9.5 + 9.7x - 6.5 - 3.9x\) 
45. \(9.0 - 14.8x - 15.5x + 12.3\)
Solve the equation.

46. $1.2x + 3.2 = 0.5x + 2.15$  
47. $4x - 5.8 = 2x + 10$  
48. $-12.2 = -6.1c$

Solve.

49. Last year, Susan’s average credit card bill was $124.43. Last month, her credit card bill was $166.79. How much above last year's average was last month's bill?

50. A printing company charges $2.3715 for each party invitation it prints. What would be the cost (before tax) for printing 400 party invitations? (Round the answer to the nearest cent.)

51. A meter is a unit of measure in the metric system that is approximately equal to 39.37 inches. Gina is 2.05 meters tall. What is her approximate height in inches? (Round to the nearest hundredth.)

52. A farmer sells 10,000 bushels of cotton for $2.90 a bushel. How much did the farmer receive?

53. Madison, Amanda, and Steven enter a 49.1-mile bicycle team relay race. They complete the course in 2.22 hours. What was their average speed on the course? (Round to the nearest tenth.)

54. There are approximately 2.54 centimeters in 1 inch. How many inches are there in 130 centimeters? (Round to the nearest hundredth.)

55. In a practice run, a race car driver's speed is clocked at 138.555 mph at the end of his first lap, and at 166.441 mph at the end of the next lap. How much faster was he driving at the end of the second lap?
56. Find the height of the cliff. Round to the nearest hundredth meter.

57. A rectangular plot of land is 74 yards by 82 yards. Find the length of the diagonal to the nearest tenth yard.

58. One end guy wire is attached to the top of a 27-foot pole and the other end is anchored into the ground 22 feet from the base of the pole. Find the length of the guy wire. Round to the nearest tenth foot.

59. Give the decimal number for $\pi$ rounded to the nearest hundredth.

Find the exact circumference of the circle.

60.  

61.  

Approximate the circumference of the circle using 3.14 for \( \pi \).

62. A windmill is constructed having blades 10.6 feet long. The length of the blades will be the radius of the circle which the windmill will sweep. What is the circumference of the circle which the windmill will sweep?

Divide and round the quotient as indicated.

63. Divide 6.51 by 0.059 and round the quotient to the nearest hundredth.

64. Divide 132.25 by 5.1 and round the quotient to the nearest hundredth.

65. Divide 1068.18 by 0.026 and round the quotient to the nearest thousandth.

Write the fraction as a decimal. Round to the nearest thousandth, if necessary.

66. \( \frac{13}{38} \)

67. An organization surveys its members and finds that \( \frac{59}{82} \) of them play a musical instrument. Write this fraction as a decimal. Round to the nearest thousandth, if necessary.

Arrange in order from smallest to largest.

68. 0.05, 0.04, 0.045, 0.054

69. \( \frac{3}{4}, \frac{5}{6}, \frac{4}{5}, 0.95 \)

Find the area of the figure. Round to the nearest thousandth, if necessary.

70.

71.
Find the square root.

72. $\sqrt{36}$

73. $\sqrt{\frac{1}{100}}$

74. $\sqrt{\frac{4}{225}}$

Approximate the square root. Round to the nearest thousandth.

75. $\sqrt{134}$

76. $\sqrt{680}$

Using the given lengths of two sides of a right triangle, find the length of the side not given. Round to the nearest thousandth.

77. leg = 3 m, leg = 1 m

78. leg = 9 in, hypotenuse = 15 in

79.

ANSWERS

1. four and nine hundred twenty-seven hundred-thousandths

2. four and seventy-nine hundredths

3. 100.2

4. 173.019 mph

5. 697.4051

6. $\frac{1}{2}$

7. <

8. >

9. >

10. <

11. <

12. 8.748

13. 80

14. 29.11

15. 80.10

16. $\$100$

17. 286.889

18. 22.90

19. 0.1215

20. –0.053135

21. 2.052

22. 1

23. –10.5

24. –5.6535

25. 20.5352

26. 0.59

27. 5.100

28. –50

29. 2425.4

30. –0.73

31. –0.086

32. 2.26

33. 0.098

34. 6.03

35. –10.8

36. 13

37. 0.625

38. Yes

39. Yes

40. Yes

41. No

42. No

43. Yes

44. 5.8x – 16

45. –30.3x + 21.3

46. –1.5

47. 7.9

48. 2

49. $\$42.36$

50. $\$948.60$

51. 80.71 in

52. $\$29,000.00$

53. 22.1 mph

54. 51.18 in

55. 27.886 mph

56. 37.52 m

57. 110.5 yards

58. 34.8 feet

59. 3.14

60. 11.8 $\pi$ m

61. 18.5 $\pi$ in

62. 66.568 feet

63. 110.34

64. 25.93

65. 41,083.846

66. 0.342

67. 0.72

68. 0.04, 0.045, 0.05, 0.054

69. $\frac{3}{4}, \frac{4}{5}, 0.95$

70. 960 ft$^2$

71. 598.5 yd$^2$

72. 6

73. $\frac{1}{10}$

74. $\frac{2}{15}$

75. 11.576

76. 26.077

77. 3.162 m

78. 12 in

79. 9 cm
Review for Real Number Supplement

Graph the number on the real number line.

1. –4.7

2. \( \sqrt{11} \)

3. \( -\sqrt{13} \)

4. \( 3 \frac{7}{8} \)

Graph the inequality.

5. \( x > -2 \)

6. \( -6 < x < -1 \)

7. \( x \leq 4 \)

Identify the set(s) to which each of the numbers belongs. The sets include the natural numbers, whole numbers, integers, rational numbers, irrational numbers, and real numbers.

8. \( \frac{3}{7} \)

9. \( \frac{9}{\sqrt{25}} \)

10. 7.322 \ldots

11. \( \frac{15}{7} \)

12. \(-\sqrt{15} \)

13. -7

14. 5.363363336 \ldots

15. \( \sqrt{196} \)
**Answers**

1. rational, real

2. rational, real

3. rational, real

4. rational, real

5. rational, real

6. rational, real

7. irrational, real

8. rational, real

9. rational, real

10. rational, real

11. rational, real

12. irrational, real

13. integer, rational, real

14. irrational, real

15. natural, whole, integer, rational, real
Review for Chapter Six Exam

Write each ratio using fractional notation. Do not simplify.

1. $5.9 \text{ to } 1.4$

2. $\frac{6\frac{2}{5}}{1\frac{5}{6}}$

Write each ratio as a ratio of whole numbers using fractional notation. Write the fraction in simplest form.

3. According to an organization’s membership list, it has 2750 members who have children and 2000 members who are childless. What is the ratio of members who have children to members who are childless?

4. Find the ratio of the width to the perimeter of the rectangular dog run sketched below.

Find each ratio of the corresponding sides of the given similar triangles. Write the ratio in simplest form.

5.

6.

Write each rate as a fraction in simplest form.

7. 11 cars for 66 people

8. 77 printers for 84 computers

Write each rate as a unit rate.

9. 450 miles on 10 gallons of gas

10. 10 cents for 5 marbles
Find the unit price.

11. $41.60 for 4 cassette tapes

12. Find which is the better buy (lower cost per ounce) by finding each unit price rounded to three decimal places if necessary. Assume that different sizes of the same brand are being compared.

   Shampoo:
   $6.72 for 12 ounces
   $9.90 for 18 ounces

Write each sentence as a proportion.

13. 5 diamonds is to 11 rubies as

14. $42 is to 35 bottles as $30 is to

Write ‘True’ if the statement is true and ‘False’ is the statement is false.

15. \( \frac{1}{8} \) = \( \frac{7}{4} \)

16. \( \frac{24}{18} = \frac{4}{3} \)

Solve each proportion for the given variable. Round the solution where indicated.

17. \( \frac{x}{57} = \frac{5}{19} \)

18. \( \frac{1}{6} = \frac{x}{56} \)

19. \( \frac{16}{x} = \frac{8}{3} \)

20. \( \frac{61}{3} = \frac{7}{z} \) Round to the nearest thousandth.

Given that the pairs of triangles are similar, find the unknown length \( x \).

21. \( \frac{0.25}{0.11} = \frac{x}{0.055} \)

22. \( \frac{50}{48} = \frac{x}{7} \)
Solve.

23. On an architect’s blueprint, 1 inch corresponds to 12 feet. Find the length of a wall represented by a line $6\frac{1}{4}$ inches long on the blueprint. Round to the nearest tenth if necessary.

24. A bag of fertilizer covers 2000 square feet of lawn. Find how many bags of fertilizer should be purchased to cover a rectangular lawn 110 feet by 140 feet.

25. A fire fighter needs to estimate the height of a burning building. She estimates the length of her shadow to be 8 feet long and the length of the building’s shadow to be 72 feet long. Find the height of the building if the fire fighter is $5\frac{1}{3}$ feet tall. Round to the nearest tenth if necessary.

26. On an architect’s blueprint, 1 inch corresponds to 6 feet. If an exterior wall is 8 feet long, find how long the blueprint measurement should be. Write answer as a mixed number if necessary.

27. If a flagpole 12 feet tall casts a shadow that is 16 feet long, find the length of the shadow cast by an antenna which is 30 feet tall. Round to the nearest tenth if necessary.

ANSWERS

1. 5.9, 1.4
2. $6\frac{2}{5}$, $1\frac{5}{6}$
3. $\frac{11}{8}$
4. $\frac{11}{54}$
5. $\frac{3}{5}$
6. $\frac{1}{2}$
7. 1 car 6 people
8. 11 printers 12 computers

9. 45 miles/gallon
10. 2 cents/marble
11. $10.40/$ cassette tape
12. $9.90$ for 18 ounces

13. $\frac{5}{11}$ = $\frac{15}{33}$
14. $\frac{42}{35}$ = $\frac{30}{25}$
15. False
16. True
17. 15
18. $9\frac{1}{3}$
19. $\frac{2}{3}$
20. 0.344

21. 0.125
22. $x = 14$
23. 75 feet
24. 8 bags
25. 48 feet
26. $1\frac{1}{3}$ inches
27. 40 feet
Review for Chapter Seven Exam

Solve.

1. In a survey of 100 people, 4 preferred relish on their hot dogs. What percent preferred relish?

2. A dart player made 89 bull’s eyes out of 100 attempted throws. What percent of the throws was NOT bull’s eyes?

3. A basketball player made 30 out of 100 attempted free throws. What percent of free throws was made?

Write each percent as a decimal.

4. 0.1%

5. 0.39%

6. 170%

Write each decimal as a percent.

7. 0.00554

8. 0.119

9. The Sayed family saves 0.1217 of their income. Write this decimal as a percent.

Write each percent as a fraction or mixed number in simplest form.

10. 276%

11. \( \frac{5}{7} \)%

12. \( \frac{2}{3} \)%

Write each fraction or mixed number as a percent.

13. \( \frac{29}{50} \)

14. \( \frac{5}{12} \)

15. \( \frac{7}{15} \) Round to the nearest hundredth percent.
Solve. Round decimals to the nearest thousandth and percents to the nearest tenth of a percent.

16. Write the equivalent decimal and percent for \( \frac{4}{75} \).

17. Write the equivalent fraction and percent for 0.12.

18. Write the equivalent fraction and decimal for 50%.

Translate each question into an equation. Do not solve.

19. What percent of 1 is 97?

20. What number is 53% of 37?

21. 13.6 is what percent of 36?

22. 52% of 92.2 is what number?

Solve.

23. 10% of 300 is what number?

24. 2 is what percent of 16?

25. 15 is 6% of what number?

26. 80% of 2300 is what number?

27. 71 is 0.71% of what number?

28. 132 is what percent of 66?

Solve. If necessary, round percents to the nearest tenth and all other answers to the nearest whole.

29. The Tragord family paid 17% of the purchase price of a $294,000 home as a down payment. Determine the amount of the down payment.

30. In a recent survey of 24 people, 6 said that their favorite color of car was blue. What percent of the people surveyed liked blue cars?

31. An inspector found 12 defective cameras during an inspection. If this is 0.012% of the total number of cameras inspected, how many cameras were inspected?

ANSWERS

1. 4%  2. 11%  3. 30%  4. 0.001  5. 0.0039  6. 1.7  7. 0.554%  8. 11.9%  9. 12.17%
10. \( \frac{2}{25} \)  11. \( \frac{6}{7} \)  12. \( \frac{2}{3} \)  13. 58%  14. \( \frac{2}{3} \)  15. 46.67%  16. 0.053; 5.3%  17. \( \frac{3}{25} \); 12%
18. \( \frac{1}{2} \); 0.5  19. \( x \cdot 1 = 97 \)  20. \( x = 53% \cdot 37 \)  21. 13.6 = \( x \cdot 36 \)  22. 52% \cdot 92.2 = \( x \)  23. 30  24. 12.5%  25. 250  26. 184  27. 10,000  28. 200%  29. $49,980  30. 25%  31. 100,000 cameras
Review for Chapter Nine Exam

Identify each figure as a line, a ray, a line segment, or an angle. Then name the figure using the given points.

1. 

2. 

3. 

4. 

Find the measure of the angle.

5. \( \angle BGC \) 

6. \( \angle VZW \) 

7. \( \angle EGB \) 

8. \( \angle BGE \) 

Classify each angle as acute, right, obtuse, or straight.

9. 

10. 70°

11. The measure of an obtuse angle is ____________________________.
Find the indicated angle.

12. Find the complement of $49^\circ$  
13. Find the supplement of $16^\circ$

14. Identify the pair or pairs of complementary angles.

Find the measure of the unknown angles. Figures are not drawn to scale.

15. Find the measure of $\angle x$.

16. Find the measure of $\angle h$. 

17. Find the measure of $\angle x$. 

\[ m \parallel \hat{n} \]
Convert as indicated.

18. 192 inches to feet  
19. 40 km to meters  
20. 20 yards to feet

21. 9.7 miles to feet  
22. 95.7 dm to meters  
23. 138 oz to pounds

24. 251.3 cm to millimeters  
25. 37 tons to pounds  
26. 59 kg to grams

27. 6.5 lb to ounces  
28. 118 kg to grams  
29. 45 qt to gallons

30. 351 g to milligrams  
31. 7 \(\frac{1}{2}\) pt to cups  
32. 2 \(\frac{1}{2}\) gal to quarts

33. 380 L to centiliter  
34. 8800 ml to liters  
35. 89 ml to deciliter

Find the perimeter of each figure.

36.  
\[
\text{Square: } 4.9 \text{ yd} \\
\text{3 mi} \\
\text{8 mi}
\]

37.  
\[
\text{Rectangle: } 3 \text{ mi} \\
\text{8 mi}
\]

38.  
\[
\text{Pentagon: } 8 \text{ m} \\
6 \text{ m} \\
5 \text{ m}
\]

Solve.

39. The sides of a triangle are 881 ft, 411 ft, and 652 ft. Find its perimeter.

40. A regular octagon has a side length of 7 m. Find its perimeter.

41. A rectangular room measures 12 ft by 13 ft. Find the cost of installing a strip of wallpaper around the room if the wallpaper costs $0.52 per foot.
Find the circumference of each circle.

42. \[ \text{Circumference: } 72 \text{ mi} \]
   Approximate the circumference using \( \pi = 3.14 \).

43. \[ \text{Circumference: } 25 \text{ cm} \]
   Find exact circumference.

44. \[ \text{Circumference: } 23 \text{ mi} \]
   Approximate the circumference using \( \pi = 3.14 \).

Find the area.

45. Find the area of the rectangle.

   \[ \begin{array}{c}
   9 \text{ ft} \\
   39 \text{ ft}
   \end{array} \]

46. Find the area of a circle when its circumference is \( 17.2 \pi \) units.

47. Find the area of the circle. Use 3.14 for \( \pi \). Round results to two decimal places if necessary.

   \[ \text{Radius: } 12.5 \text{ ft} \]

Solve.

48. A drapery panel measures 6 ft by 9 ft. Find the number of square feet of material needed for four panels.
Find the volume of the solid.

49. Square-based pyramid

50. Use 3.14 as the approximate value for \( \pi \). Round results to the nearest hundredth if necessary.

51. Use 3.14 as the approximate value for \( \pi \). Round results to the nearest tenth, if necessary.

Solve the problem.

52. Find the volume of a box in the shape of a cube that is 8 inches on each side.

53. Find the volume of a box 3 in. x 7 in. x 9 in.

54. A paperweight is in the shape of a square-based pyramid 14 centimeters tall. If an edge of the base is 7 centimeters, find the volume of the pyramid.
Review for Chapter Nine Exam

ANSWERS

1. ray; $EG$  
2. angle; $\angle B$  
3. angle; $\angle B$  
4. ray; $VW$  
5. $40^\circ$  
6. $25^\circ$  
7. $100^\circ$  
8. $100^\circ$  
9. Right  
10. Acute  
11. between $90^\circ$ and $180^\circ$  
12. $41^\circ$  
13. $164^\circ$  
14. $\angle ABD$ and $\angle FBC$; $\angle DBE$ and $\angle EBF$  
15. $42^\circ$  
16. $156^\circ$  
17. $72^\circ$  
18. $16$  
19. $40,000$ m  
20. $60$  
21. $51,216$  
22. $9.57$ m  
23. $\frac{5}{8}$ lb  
24. $2,513$ mm  
25. $74,000$ lb  
26. $59,000$ grams  
27. $104$ oz  
28. $118,000$ grams  
29. $11\frac{1}{4}$ gal  
30. $351,000$ milligrams  
31. $15$ c  
32. $10$ qt  
33. $38,000$ cl  
34. $8.8$ L  
35. $0.89$ dl  
36. $19.6$ yd  
37. $22$ mi  
38. $26$ m  
39. $1,944$ ft  
40. $56$ m  
41. $\$26.00$  
42. $452.16$ mi  
43. $50\pi$ cm  
44. $72.22$ mi  
45. $351$ sq. ft  
46. $73.96\pi$ sq. units  
47. $490.63$ ft$^2$  
48. $216$ sq. ft  
49. $53\frac{1}{3}$ cu. in.  
50. $4.85$ cu. units  
51. $274.8$ cu. ft  
52. $512$ cu. in.  
53. $189$ cu. in.  
54. $228\frac{2}{3}$ cu. cm
# Final Exam Review

<table>
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<tr>
<th></th>
<th>Problem</th>
<th>Section</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Graph 3 on the number line.</td>
<td>1.2</td>
<td><img src="image" alt="Number Line Diagram" /></td>
</tr>
<tr>
<td>2.</td>
<td>On the number line, which number is 6 units to the left of 11?</td>
<td>1.2</td>
<td>5</td>
</tr>
<tr>
<td>3.</td>
<td>Place the correct symbol, &lt;, =, or &gt;, between these two numbers: 6409</td>
<td>1.2</td>
<td>&lt;</td>
</tr>
<tr>
<td></td>
<td>6490</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Write the given numbers in order from smallest to largest.</td>
<td>1.2</td>
<td>406, 438, 483, 492, 497</td>
</tr>
<tr>
<td></td>
<td>483, 497, 492, 406, 438</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Write 1,042,023 in words.</td>
<td>1.2</td>
<td>One million forty-two thousand twenty-three</td>
</tr>
<tr>
<td>6.</td>
<td>Write two hundred forty-seven thousand sixty-three in standard form.</td>
<td>1.2</td>
<td>247,063</td>
</tr>
<tr>
<td>7.</td>
<td>Write 307,420 in expanded form.</td>
<td>1.2</td>
<td>300,000+7000+400+20</td>
</tr>
<tr>
<td>8.</td>
<td>According to the 1990 census, the population of Nebraska is 1,578,385,</td>
<td>1.2</td>
<td>Nebraska</td>
</tr>
<tr>
<td></td>
<td>the population of Nevada is 1,201,833, the population of New Hampshire</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>is 1,109,252, and the population of New Mexico is 1,515,069. Which of</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>the four states has the greatest population?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Add: 314,892</td>
<td>1.3</td>
<td>502,147</td>
</tr>
<tr>
<td></td>
<td>77,413</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>+109,842</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Find the sum of 923,411 and 21,327.</td>
<td>1.3</td>
<td>944,738</td>
</tr>
<tr>
<td>11.</td>
<td>Evaluate $a + b + c$ when $a = 2,307$, $b = 9,765$, and $c = 5,739$.</td>
<td>1.3</td>
<td>17,811</td>
</tr>
<tr>
<td>12.</td>
<td>Subtract: 35,021</td>
<td>1.3</td>
<td>25,935</td>
</tr>
<tr>
<td></td>
<td>- 9,086</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Find 92,061 decreased by 29,432.</td>
<td>1.3</td>
<td>62,629</td>
</tr>
<tr>
<td>14.</td>
<td>You have a checking account balance of $1,509$. You then wrote checks</td>
<td>1.3</td>
<td>$890</td>
</tr>
<tr>
<td></td>
<td>for $179$, $413$, and $27$. Find the new checking account balance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Multiply: 975 · 4</td>
<td>1.6</td>
<td>3,900</td>
</tr>
<tr>
<td>16.</td>
<td>Multiply: 796</td>
<td>1.6</td>
<td>245,964</td>
</tr>
<tr>
<td></td>
<td>× 309</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>What is the product of 300, 5, 70, and 0?</td>
<td>1.6</td>
<td>0</td>
</tr>
<tr>
<td>18.</td>
<td>Evaluate $2st$ when $s = 45$ and $t = 67$.</td>
<td>1.6</td>
<td>6,030</td>
</tr>
<tr>
<td>19.</td>
<td>Write $a · a · a · b · b · b$ in exponential form.</td>
<td>1.8</td>
<td>$a^4 b^3$</td>
</tr>
<tr>
<td>20.</td>
<td>Evaluate $6 · 2^3 · 3^2$.</td>
<td>1.8</td>
<td>432</td>
</tr>
<tr>
<td>21.</td>
<td>Find the cube of 9.</td>
<td>1.8</td>
<td>729</td>
</tr>
<tr>
<td>22.</td>
<td>Evaluate $a^4 b^3$ when $a = 2$ and $b = 3$.</td>
<td>1.8</td>
<td>432</td>
</tr>
</tbody>
</table>
23. Divide: $6 \div 38,029$  
   $6338$ r$1$  

24. Divide: $4,207 \div 309$  
   $13$ r$190$  

25. What is the quotient of $3096$ and $8$?  
   $387$  

26. Evaluate $\frac{x}{y}$ when $x = 23,680$ and $y = 8$.  
   $2,960$  

27. Find all the factors of $56$.  
   $1, 2, 4, 7, 8, 14, 28, 56$  

28. Find the prime factorization of $150$.  
   $2 \cdot 3 \cdot 5^2$  

29. A consumer makes a down payment of $1,500 on a computer system costing $5,820. The balance is to be repaid in 24 equal monthly payments. What is the monthly payment?  
   $180$  

30. Round $549,601$ to the nearest thousand.  
   $550,000$  

31. Estimate the sum of $924$, $736$, $182$, and $507$.  
   $2,300$  

32. Estimate the difference between $65,271$ and $24,903$.  
   $50,000$  

33. Estimate the product of $5,549$ and $33$.  
   $180,000$  

34. Estimate the quotient of $37,052$ and $41$.  
   $1,000$  

35. The coastline of the United States measures $12,383$ statute miles. Find the coastline of the United States to the nearest hundred statute miles.  
   $12,400$ statute miles  

36. Simplify: $12 - 3(10 - 2) \div 6$  
   $8$  

37. Simplify: $2^2 + 3(6-1)-3$  
   $16$  

38. Evaluate $2x + (x - y)^3$ when $x = 9$ and $y = 7$.  
   $26$  

39. Graph $x$ on the number line when $x = -2$.  

40. On the number line, which number is 2 units to the left of $-3$?  
   $-5$  

41. Place the correct symbol, $<$ or $>$, between the two numbers. $-36$ $-49$  
   $>$  

42. Write the given numbers in order from smallest to largest. $10$, $-11$, $-4$, $7$, $-9$  
   $-11$, $-9$, $-4$, $7$, $10$  

43. Find the opposite of $-v$.  
   $v$  

44. Write the expression in words. $-5 + (-11)$  
   Negative five plus negative eleven  

45. Find the absolute value of $-16$.  
   $16$  

46. Evaluate $-|-27|$  
   $-27$  

47. Evaluate $|-y|$, where $y = -5$.  
   $5$  

48. Place the correct symbol, $<$, $=$, or $>$, between the numbers. $|-4|$, $|-5|$  
   $<$  

49. Write the given numbers in order from smallest to largest. $(-4)$, $-|5|$, $-|-9|$, $-|6|$, $-1$  
   $-|-9|$, $-|5|$, $-1$, $-(-4)$,
<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>50.</td>
<td>Which is the highest temperature, (-8^\circ C), (-17^\circ C), (-29^\circ C), or (-6^\circ C)?</td>
<td>2.1</td>
<td>(-6^\circ C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>51.</td>
<td>Add: (-17 + (-4) + 13 + (-6))</td>
<td>2.2</td>
<td>(-14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>52.</td>
<td>Evaluate (-a + (-b)) when (a = -8) and (b = 3).</td>
<td>2.2</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>53.</td>
<td>Subtract: (5 - (-6) - (-1))</td>
<td>2.3</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>54.</td>
<td>Simplify: (-44 + 24 - (-18) - 3)</td>
<td>2.3</td>
<td>(-5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>55.</td>
<td>Evaluate (-x - (-y) - z) when (x = 9), (y = 1), and (z = -15).</td>
<td>2.3</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>56.</td>
<td>Use the formula (S = N - P), where (S) is a golfer’s score in a tournament, (N) is the number of strokes made by the golfer, and (P) is par, to find a golfer’s score when the golfer made 186 strokes and par is 201.</td>
<td>2.3</td>
<td>(-15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>57.</td>
<td>Multiply: (-5(7)(-4))</td>
<td>2.4</td>
<td>140</td>
<td></td>
<td></td>
</tr>
<tr>
<td>58.</td>
<td>What is the product of (-40) and 60?</td>
<td>2.4</td>
<td>(-2400)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>59.</td>
<td>Evaluate (x(-y)) when (x = -4) and (y = -9).</td>
<td>2.4</td>
<td>(-36)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60.</td>
<td>Divide: (-128/8)</td>
<td>2.4</td>
<td>(-16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>61.</td>
<td>What is (-480) divided by (-40)?</td>
<td>2.4</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>62.</td>
<td>Evaluate (-m \div n) when (m = -28) and (n = -7).</td>
<td>2.4</td>
<td>(-4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>63.</td>
<td>The boiling point of radon is (-62^\circ C). The melting point of neon is four times the boiling point of radon. Find the melting point of neon?</td>
<td>2.4</td>
<td>(-248^\circ C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>64.</td>
<td>Simplify: ((-3)^3 \cdot (3 - 7)^2 - (-8)\div 2)</td>
<td>2.5</td>
<td>(-428)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>65.</td>
<td>Evaluate ((b - c)^2 - 2d) when (b = 4), (c = -1), and (d = -2).</td>
<td>2.5</td>
<td>29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>66.</td>
<td>Find the LCM of 13, 27, and 39.</td>
<td>4.4</td>
<td>351</td>
<td></td>
<td></td>
</tr>
<tr>
<td>67.</td>
<td>Find the GCF of 27, 36, and 81.</td>
<td>4.4</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>68.</td>
<td>Express the shaded portion of the circles as an improper fraction and as a mixed number</td>
<td>4.1</td>
<td>(\frac{27}{8} ; \frac{3}{8})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>69.</td>
<td>Write (\frac{25}{6}) as a mixed number or a whole number.</td>
<td>4.8</td>
<td>(4\frac{1}{6})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70.</td>
<td>Write (\frac{2}{9}) as an improper fraction.</td>
<td>4.8</td>
<td>(\frac{38}{9})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>71.</td>
<td>Write a fraction that is equivalent to (\frac{2}{7}) and has a denominator of 42.</td>
<td>4.1</td>
<td>(\frac{12}{42})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>72.</td>
<td>Write (\frac{35}{49}) in simplest form.</td>
<td>4.2</td>
<td>(\frac{5}{7})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Description</td>
<td>Solution</td>
<td></td>
<td></td>
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<td>----------</td>
<td>-------------</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>73.</td>
<td>Place the correct symbol, $&lt;$, $=$, or $&gt;$, between the two numbers. $\frac{5}{6}$ $\frac{7}{9}$</td>
<td>$\frac{5}{6} &gt; \frac{7}{9}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>74.</td>
<td>In a history class, 3 students received an A, 4 students received a B, 6 students received a C, and 2 students received a D. What fraction of the students in the class received an A?</td>
<td>$\frac{1}{5}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75.</td>
<td>Add: $\frac{4}{5} + 2 \frac{9}{10} + 4 \frac{1}{2}$</td>
<td>$11 \frac{1}{5}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>76.</td>
<td>Find the sum of $-\frac{7}{15}$ and $-\frac{11}{18}$</td>
<td>$-1 \frac{7}{90}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>77.</td>
<td>What is $\frac{7}{10}$ more than $\frac{5}{6}$?</td>
<td>$9 \frac{8}{15}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>78.</td>
<td>Evaluate $x + y$ when $x = \frac{4}{21}$ and $y = -\frac{25}{28}$</td>
<td>$-\frac{59}{84}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>79.</td>
<td>Subtract: $-\frac{11}{20} - \frac{7}{30}$</td>
<td>$-\frac{47}{60}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80.</td>
<td>Subtract $\frac{5}{9} - 3 \frac{11}{12}$</td>
<td>$2 \frac{23}{36}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>81.</td>
<td>What is $\frac{7}{10}$ less than $\frac{5}{8}$?</td>
<td>$2 \frac{37}{40}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>82.</td>
<td>Evaluate $x - y$ when $x = 4 \frac{2}{9}$ and $y = 1 \frac{4}{15}$.</td>
<td>$2 \frac{43}{45}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>83.</td>
<td>Two inlet pipes are being used to fill a tank. After one hour, the smaller pipe has filled $\frac{2}{7}$ of the tank and the larger pipe has filled $\frac{1}{3}$ of the tank. How much of the tank remains to be filled?</td>
<td>$\frac{8}{21}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>84.</td>
<td>Multiply: $\frac{5}{6} \cdot \frac{18}{25} \cdot \frac{5}{9}$</td>
<td>$\frac{1}{3}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>85.</td>
<td>Multiply: $-21 \cdot \frac{3}{14}$</td>
<td>$-4 \frac{1}{2}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>86.</td>
<td>What is $\frac{7}{12}$ multiplied by $\frac{3}{7}$?</td>
<td>$12 \frac{2}{7}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>87.</td>
<td>Divide: $0 \div \frac{3}{5}$</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>88.</td>
<td>Find $\frac{6}{7}$ divided by $\frac{1}{2}$.</td>
<td>$1 \frac{19}{49}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>89.</td>
<td>Evaluate $x + y$ when $x = -\frac{2}{3}$ and $y = \frac{8}{21}$.</td>
<td>$-1 \frac{3}{4}$</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
90. An 18-foot board is cut into pieces $\frac{1}{3}$ ft. long for use as bookshelves. What is the length of the remaining piece after as many shelves as possible are cut?  

4.8 \quad 1 \frac{1}{3}$ ft.  

91. Evaluate $3 \cdot \left( \frac{4}{7} \right)^2 \cdot \left( \frac{1}{2} \right)^4$  

4.6 \quad \frac{3}{49}$  

92. Evaluate $x^2 y^4$ when $x = \frac{7}{9}$ and $y = 1 \frac{1}{2}$.  

4.8 \quad 16$  

93. Simplify: $\frac{4 \frac{1}{2} + \frac{1}{3}}{\frac{3}{2} + \frac{2}{3}}$  

4.8 \quad \frac{23}{35}$  

94. Evaluate $\frac{wx}{y+z}$ when $w = \frac{4}{5}$, $x = \frac{5}{6}$, $y = \frac{5}{6}$, and $z = \frac{2}{3}$.  

4.6 \quad \frac{4}{9}$  

95. Simplify: $\left( \frac{3}{4} \right)^2 + \frac{9-7}{8-5} \times \frac{1}{3}$  

4.6 \quad 2 \frac{9}{16}$  

96. Evaluate $\frac{w-z^2}{xy}$ when $w = \frac{2}{3}$, $x = \frac{3}{8}$, $y = \frac{2}{5}$, and $z = \frac{1}{2}$.  

4.6 \quad 2 \frac{7}{9}$  

97. Name the place value of the digit 3 in 461.02378.  

5.1 thousandths  

98. Write $\frac{541}{1,000}$ as a decimal.  

5.1 \quad 0.541  

99. Write 0.83 as a fraction.  

5.1 \quad \frac{83}{100}$  

100. Write 4.007 in words.  

5.1 \quad four and seven thousandths  

101. Write nineteen and seven thousand eight hundred thirteen hundred-thousandths in standard form.  

5.1 \quad 19.07813$  

102. Place the correct symbol, $<$, $=$, or $>$, between the two numbers. 3.2009, 3.209  

5.1 \quad <$  

103. Write the given numbers in order from smallest to largest. 1.528, 1.258, 1.852, 1.582  

5.1 \quad 1.258, 1.528, 1.582, 1.852$  

104. Round 816.3904 to the nearest thousandth.  

5.1 \quad 816.390$  

105. Round 87.6037 to the nearest whole number.  

5.1 \quad 88$  

106. The specific gravity of zinc is 7.133. The specific gravity of potassium is 0.862. The specific gravity of indium is 7.31. The specific gravity of chromium is 7.18. Which has the highest specific gravity?  

5.1 \quad \text{indium}$
### 107. Final Exam Review
Add: \(-6.08 + 3.1 + 12.614\)  
5.2  9.634

### 108.
Subtract: \(205.26 - (-62.043)\)  
5.2  267.303

### 109.
What is the sum of 0.94, 0.372, 0.028, and 0.627?  
5.2  1.967

### 110.
What is 5.042 less than 12.36?  
5.2  7.318

### 111.
Evaluate \(x + y + z\) when \(x = 3.5765\), \(y = 35\), and \(z = 11.08\).  
5.2  49.6565

### 112.
Estimate the sum of 0.53, 0.467, and 0.95.  
5.2  2

### 113.
Estimate the difference between 96.75 and 38.023.  
5.2  60

### 114.
You have a monthly budget of $720. This month you have already spent $25.68 for the telephone bill, $52.94 for food, $18.50 for gasoline, $180 for rent, and $83.76 for a loan repayment. How much money do you have left in the budget for the remainder of the month?  
5.2  $359.12

### 115.
Multiply: \(-7.25(0.009)\)  
5.3  -0.06525

### 116.
Find the product of 3.66 and \(10^3\).  
5.3  3,660

### 117.
Evaluate \(cd\) when \(c = -2.426\) and \(d = -8.2\).  
5.3  19.8932

### 118.
Divide and round to the nearest thousandth: \((-0.5094) ÷ (-6.81)\)  
5.4  0.075

### 119.
What is 42.012 divided by \(10^2\)?  
5.4  0.42012

### 120.
Estimate the quotient of 246.024 and 4.93.  
5.4  40

### 121.
Evaluate \(\frac{x}{y}\) for \(x = -23.1\) and \(y = -6.6\).  
5.4  3.5

### 122.
Convert \(\frac{5}{6}\) to a decimal. Place a bar over the repeating digits of a repeating decimal.  
5.6  \(5.8\overline{3}\)

### 123.
Convert 0.46 to a fraction.  
5.1  \(\frac{23}{50}\)

### 124.
Place the correct symbol, \(<\), \(=\), or \(>\), between the two numbers. \(\frac{2}{7}\) \(0.28\)  
5.6  \(>\)

### 125.
You earn an annual salary of $51,301.80. Find your monthly salary.  
5.4  $4,275.15

### 126.
Simplify \(\sqrt{144}\).  
5.8  12

### 127.
Simplify: \(5\sqrt{36} - 2\sqrt{9}\)  
5.8  24

### 128.
Simplify: \(\sqrt{16}\) \(\sqrt{25}\)  
5.8  4 \(\frac{4}{5}\)

### 129.
Evaluate \(\sqrt{b^2 - 4ac}\) when \(a = -2\), \(b = 11\), and \(c = -5\).  
5.8  9

### 130.
Between what two whole numbers is the value of \(\sqrt{131}\)?  
5.8  11 and 12
131. Graph $-3 \frac{1}{2}$ on the number line.  
132. Graph $-2.5$ on the number line.  
133. Graph all real numbers less than 1.  
134. Graph the real numbers between $-1$ and 2.  
135. Which of the following numbers listed below make the inequality $x < -2$ true?  

<table>
<thead>
<tr>
<th>Real #</th>
<th>Supp</th>
</tr>
</thead>
<tbody>
<tr>
<td>-3</td>
<td>-2.01</td>
</tr>
</tbody>
</table>

136. Graph $x \leq 1$ on the real number line.  

<table>
<thead>
<tr>
<th>Real #</th>
<th>Supp</th>
</tr>
</thead>
<tbody>
<tr>
<td>-4</td>
<td>-3</td>
</tr>
</tbody>
</table>

137. A part-time student can take a maximum of 10 credit hours per semester. Write an inequality for the number of credit hours a part-time student can take.  

<table>
<thead>
<tr>
<th>Real #</th>
<th>Supp</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x \leq 10$</td>
<td></td>
</tr>
</tbody>
</table>

138. Identify the Property of Real Numbers that justifies the statement. $7 + x = x + 7$  

<table>
<thead>
<tr>
<th>Property of Real Numbers</th>
<th>3.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Commutative Property of Addition</td>
<td></td>
</tr>
</tbody>
</table>

139. Identify the Property of Real Numbers that justifies the statement. $(-3)(a) = (a)(-3)$  

<table>
<thead>
<tr>
<th>Property of Real Numbers</th>
<th>3.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Commutative Property of Multiplication</td>
<td></td>
</tr>
</tbody>
</table>

140. Identify the Property of Real Numbers that justifies the statement. $(-4 + y) + 6 = -4 + (y + 6)$  

<table>
<thead>
<tr>
<th>Property of Real Numbers</th>
<th>3.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Associative Property of Addition</td>
<td></td>
</tr>
</tbody>
</table>

141. Identify the Property of Real Numbers that justifies the statement. $8 \cdot (5 \cdot d) = (8 \cdot 5) \cdot d$  

<table>
<thead>
<tr>
<th>Property of Real Numbers</th>
<th>3.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Associative Property of Multiplication</td>
<td></td>
</tr>
</tbody>
</table>

142. Identify the Property of Real Numbers that justifies the statement. $c + 0 = c$  

<table>
<thead>
<tr>
<th>Property of Real Numbers</th>
<th>1.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Addition Property of Zero</td>
<td></td>
</tr>
</tbody>
</table>

143. Identify the Property of Real Numbers that justifies the statement. $1 \cdot a = a$  

<table>
<thead>
<tr>
<th>Property of Real Numbers</th>
<th>1.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Multiplication Property of One</td>
<td></td>
</tr>
</tbody>
</table>

144. Identify the Property of Real Numbers that justifies the statement. $\frac{3}{5} + \frac{3}{5} = 0$  

<table>
<thead>
<tr>
<th>Property of Real Numbers</th>
<th>1.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Inverse Property of Addition</td>
<td></td>
</tr>
</tbody>
</table>

145. Identify the Property of Real Numbers that justifies the statement. $\frac{4}{7} \cdot \frac{7}{4} = 1$  

<table>
<thead>
<tr>
<th>Property of Real Numbers</th>
<th>4.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Inverse Property of Multiplication</td>
<td></td>
</tr>
</tbody>
</table>

146. Simplify: $(-4t) \cdot 8$  

<table>
<thead>
<tr>
<th>Property of Real Numbers</th>
<th>3.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>$-32t$</td>
<td></td>
</tr>
</tbody>
</table>
### Final Exam Review

147. Simplify: \( -\frac{2}{3}(12x) \)  
   4.1  
   -8x  

148. Simplify: -3(2x - 5) by using the Distributive Property.  
   3.1  
   -6x + 15  

149. Simplify: -(2a + 5b + 1) by using the Distributive Property.  
   3.1  
   -2a - 5b - 1  

150. Simplify: \( -2x^2 + 6x + 1 + 10x^2 - 8x - 1 \)  
   3.1  
   8x^2 - 2x  

151. Simplify: \( 7b - 2[3(4 - b) - 5(2b + 1)] \)  
   3.1  
   33b - 14  

152. Which number (7, 4, 3, or 2) is a solution of \( 4y - 3 = 2(y - 4) + 9 \)?  
   3.1  
   2  

153. Solve: \( a + 12 = -2 \)  
   3.2  
   -14  

154. Solve: \( 6 + a = 4 \)  
   3.2  
   -2  

155. Solve: \( -8 = -7 + x \)  
   3.2  
   -1  

156. Solve: \( x - \frac{3}{4} = -\frac{5}{8} \)  
   4.7  
   \( \frac{1}{8} \)  

157. Solve: \( -2x = 14 \)  
   3.3  
   -7  

158. Solve: \( -36 = 9y \)  
   3.3  
   -4  

159. Solve: \( -5x = -30 \)  
   3.3  
   6  

160. Solve: \( \frac{3}{5}y = -9 \)  
   4.7  
   -15  

161. Solve: \( \frac{n}{2} = 12 \)  
   3.3  
   24  

162. Solve: \( -20 = -\frac{3}{4}x \)  
   4.7  
   \( \frac{80}{3} \)  

163. Solve: \( 3y - 11 = -5 \)  
   3.4  
   2  

164. Solve: \( 5 = -8b + 13 \)  
   3.4  
   1  

165. Solve: \( 0 = 15 - 5b \)  
   3.4  
   3  

166. Solve: \( -2x + 3 = -5 \)  
   3.4  
   4  

167. Solve: \( 3v - \frac{3}{5} = \frac{12}{5} \)  
   4.7  
   1  

168. Solve: \( 2n + \frac{1}{2} = -\frac{7}{4} \)  
   4.7  
   \( -\frac{9}{8} \)  

169. Solve: \( \frac{x}{7} - 2 = -1 \)  
   3.4  
   7  

170. Solve: \( \frac{2}{3}x - 3 = 5 \)  
   4.7  
   12  

171. Find the Celsius temperature when the Fahrenheit temperature is -40°. Use the formula \( F = \frac{9}{5}C + 32 \), where \( F \) is the Fahrenheit temperature and \( C \) is the Celsius temperature.  
   4.7  
   -40°  

172. Solve: \( 3x - 5 = 5x + 7 \)  
   3.4  
   -6
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<th>Question</th>
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<tbody>
<tr>
<td>173.</td>
<td>Solve: $11 - 3n = 2n + 9$</td>
<td>$n = 2$</td>
<td>3.4</td>
<td>$\frac{5}{5}$</td>
</tr>
<tr>
<td>174.</td>
<td>Solve: $-3w - 4 = 5w - 20$</td>
<td>$w = 2$</td>
<td>3.4</td>
<td>2</td>
</tr>
<tr>
<td>175.</td>
<td>Solve: $4 - 2(x - 3) = 5$</td>
<td>$x = 5$</td>
<td>3.4</td>
<td>$\frac{2}{2}$</td>
</tr>
<tr>
<td>176.</td>
<td>Solve: $5 - 5x = 7x - 3(5x - 6)$</td>
<td>$x = 13$</td>
<td>3.4</td>
<td>$\frac{3}{3}$</td>
</tr>
<tr>
<td>177.</td>
<td>Solve: $2(3 - 5a) + 6a = 3(a + 4)$</td>
<td>$a = 6$</td>
<td>3.4</td>
<td>$\frac{7}{7}$</td>
</tr>
<tr>
<td>178.</td>
<td>A force of 120 lb is applied at one end of a lever 18 ft long. A force of 80 lb is applied at the other end. Find the distance of the fulcrum from the 120-lb force when the system balances. Use the equation $F_1x = F_2(d - x)$, where $F_1$ and $F_2$ are the two forces, $x$ is the distance from $F_1$ to the fulcrum, and $d - x$ is the distance from $F_2$ to the fulcrum.</td>
<td>$x = 7.2$ ft</td>
<td>3.4</td>
<td>7.2 ft</td>
</tr>
<tr>
<td>179.</td>
<td>Write the comparison 12 lb to 9 lb as a ratio in simplest form using a fraction.</td>
<td>$\frac{4}{3}$</td>
<td>6.1</td>
<td>4</td>
</tr>
<tr>
<td>180.</td>
<td>Write “40 mi in 12 h” as a rate in simplest form.</td>
<td>$\frac{10\text{mi}}{3\text{h}}$</td>
<td>6.2</td>
<td>13.67</td>
</tr>
<tr>
<td>181.</td>
<td>Write “$33,000 earned in 12 months’ as a unit rate.</td>
<td>$\frac{2,750}{\text{month}}$</td>
<td>6.2</td>
<td>$2,750/\text{month}$</td>
</tr>
<tr>
<td>182.</td>
<td>A company’s cost to produce 100 calculators was $3,200. The company sold the calculators to the retail store for $4,500. What was the company’s profit on each calculator?</td>
<td>$\frac{13}{\text{calculator}}$</td>
<td>6.1</td>
<td>13</td>
</tr>
<tr>
<td>183.</td>
<td>Convert 108 in. to feet.</td>
<td>9.2</td>
<td>9 ft.</td>
<td></td>
</tr>
<tr>
<td>184.</td>
<td>Convert 80 km/h to meters per second. Round to the nearest tenth.</td>
<td>$\frac{22.2}{\text{m/s}}$</td>
<td>9.2</td>
<td>22.2 m/s</td>
</tr>
<tr>
<td>185.</td>
<td>Which proportion $\left(\frac{\frac{2}{3} = \frac{44}{66}, \frac{5}{\frac{30}{45}}, \frac{5}{\frac{35}{64}}, \frac{1}{2} = \frac{30}{50}}\right)$ is true?</td>
<td>$\frac{2}{3} = \frac{44}{66}$</td>
<td>6.3</td>
<td>$\frac{44}{66}$</td>
</tr>
<tr>
<td>186.</td>
<td>Solve: $\frac{7}{12} = \frac{n}{144}$</td>
<td>$n = 84$</td>
<td>6.3</td>
<td>84</td>
</tr>
<tr>
<td>187.</td>
<td>Solve: $\frac{5}{y} = \frac{30}{82}$. Round to the nearest hundredth.</td>
<td>$y = 13.67$</td>
<td>6.3</td>
<td>13.67</td>
</tr>
<tr>
<td>188.</td>
<td>Solve: $\frac{5}{2} = \frac{20}{n + 2}$</td>
<td>$n = 6$</td>
<td>6.3</td>
<td>6</td>
</tr>
<tr>
<td>189.</td>
<td>A stock investment of 400 shares paid a dividend of $320. At this rate, how many additional shares are required to earn a dividend of $500?</td>
<td>$225$ additional shares</td>
<td>6.4</td>
<td>225</td>
</tr>
<tr>
<td>Question</td>
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</tr>
<tr>
<td>190.</td>
<td>Write 8% as a fraction.</td>
<td>7.1</td>
<td>( \frac{2}{25} )</td>
<td></td>
</tr>
<tr>
<td>191.</td>
<td>Write ( \frac{3}{4} )% as a fraction.</td>
<td>7.1</td>
<td>( \frac{3}{400} )</td>
<td></td>
</tr>
<tr>
<td>192.</td>
<td>Write ( \frac{6}{3} )% as a fraction.</td>
<td>7.1</td>
<td>( \frac{27}{400} )</td>
<td></td>
</tr>
<tr>
<td>193.</td>
<td>Write 7.3% as a decimal.</td>
<td>7.1</td>
<td>0.073</td>
<td></td>
</tr>
<tr>
<td>194.</td>
<td>Write 125% as a decimal.</td>
<td>7.1</td>
<td>1.25</td>
<td></td>
</tr>
<tr>
<td>195.</td>
<td>Write 37% as a decimal.</td>
<td>7.1</td>
<td>0.37</td>
<td></td>
</tr>
<tr>
<td>196.</td>
<td>Write 0.065 as a percent.</td>
<td>7.1</td>
<td>6.5%</td>
<td></td>
</tr>
<tr>
<td>197.</td>
<td>Write 1.6 as a percent.</td>
<td>7.1</td>
<td>160%</td>
<td></td>
</tr>
<tr>
<td>198.</td>
<td>Write 0.96 as a percent.</td>
<td>7.1</td>
<td>96%</td>
<td></td>
</tr>
<tr>
<td>199.</td>
<td>Write ( \frac{7}{20} ) as a percent.</td>
<td>7.1</td>
<td>35%</td>
<td></td>
</tr>
<tr>
<td>200.</td>
<td>Write ( 1 \frac{1}{5} ) as a percent.</td>
<td>7.1</td>
<td>120%</td>
<td></td>
</tr>
<tr>
<td>201.</td>
<td>Write ( \frac{5}{12} ) as a percent. Round to the nearest tenth of a percent.</td>
<td>7.1</td>
<td>41.7%</td>
<td></td>
</tr>
<tr>
<td>202.</td>
<td>What percent of 75 is 50?</td>
<td>7.2</td>
<td>( 66 \frac{2}{3} )%</td>
<td></td>
</tr>
<tr>
<td>203.</td>
<td>What percent of 90 is 36?</td>
<td>7.2</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>204.</td>
<td>32% of what is 19.2?</td>
<td>7.2</td>
<td>60</td>
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<tr>
<td>205.</td>
<td>Find ( 16 \frac{2}{3} )% of 66.</td>
<td>7.2</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>206.</td>
<td>16 is what percent of 10?</td>
<td>7.4</td>
<td>160%</td>
<td></td>
</tr>
<tr>
<td>207.</td>
<td>Ten years ago, a painting was priced at $5,000. Today the painting has a value of $12,000. What percent of the price ten years ago is its value today?</td>
<td>7.4</td>
<td>240%</td>
<td></td>
</tr>
<tr>
<td>208.</td>
<td>A typist made errors on four words on a typing test. This was 2.5% of the total number of words typed. How many words were typed?</td>
<td>7.4</td>
<td>160 words</td>
<td></td>
</tr>
<tr>
<td>209.</td>
<td>The annual property tax for a house is 1.5% of the value of the house. What was the value of a house during a year in which the property taxes were $1,395?</td>
<td>7.4</td>
<td>$93,000</td>
<td></td>
</tr>
<tr>
<td>210.</td>
<td>Determine the complement of a 75° angle.</td>
<td>9.1</td>
<td>15°</td>
<td></td>
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<tr>
<td>211.</td>
<td>Determine the supplement of a 127° angle.</td>
<td>9.1</td>
<td>53°</td>
<td></td>
</tr>
<tr>
<td>212.</td>
<td>Given ( BC = 18 ) mm and ( AB ) is two-thirds the length of ( BC ), find the length of ( AC ).</td>
<td>9.1</td>
<td>30 mm</td>
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<tr>
<td><strong>213.</strong></td>
<td>Given that $\angle ABC$ is a right angle, determine the measure of $\angle x$.</td>
<td>9.1</td>
<td>25°</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$A$</td>
<td>$2x + 15^\circ$</td>
<td>$x$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$B$</td>
<td></td>
<td>$C$</td>
<td></td>
</tr>
<tr>
<td><strong>214.</strong></td>
<td>Find $x$.</td>
<td>9.1</td>
<td>43°</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$2x$</td>
<td>$x + 8^\circ$</td>
<td>$x$</td>
<td></td>
</tr>
<tr>
<td><strong>215.</strong></td>
<td>Find the measure of angle $a$.</td>
<td>9.1</td>
<td>25°</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$155^\circ$</td>
<td>$a$</td>
<td>$c$</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$b$</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>216.</strong></td>
<td>Find the measure of angle $b$.</td>
<td>9.1</td>
<td>155°</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$155^\circ$</td>
<td>$a$</td>
<td>$c$</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$b$</td>
<td></td>
<td></td>
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<tr>
<td><strong>217.</strong></td>
<td>Find $x$.</td>
<td>9.1</td>
<td>68°</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$4x - 32^\circ$</td>
<td>$2x + 104^\circ$</td>
<td></td>
<td></td>
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<tr>
<td><strong>218.</strong></td>
<td>Find $x$.</td>
<td>9.1</td>
<td>70°</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$2x$</td>
<td>$3x - 170^\circ$</td>
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</tbody>
</table>
| **219.** | $L_1 \parallel L_2$. Find the measure of angles $a$, $b$, $c$ and $d$. | 9.1 | angle $a = 27^\circ$
angle $b = 153^\circ$
angle $c = 27^\circ$
angle $d = 153^\circ$ |
<p>|   | $27^\circ$ | $a$ | $b$ |
|   | $b$ | $c$ | $d$ |</p>
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<tr>
<td>220.</td>
<td>( L_1 \parallel L_2 ). Find ( x ).</td>
<td>9.1</td>
<td>21°</td>
</tr>
<tr>
<td></td>
<td>[Diagram showing ( 100° ) and ( 4x - 4° )]</td>
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<tr>
<td>221.</td>
<td>( L_1 \parallel L_2 ). Find ( x ).</td>
<td>9.1</td>
<td>34°</td>
</tr>
<tr>
<td></td>
<td>[Diagram showing ( 100° ) and ( 3x - 2° )]</td>
<td></td>
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</tr>
<tr>
<td>222.</td>
<td>A triangle has a 21° angle and a 64° angle. Find the measure of the other angle.</td>
<td>9.1</td>
<td>95°</td>
</tr>
<tr>
<td>223.</td>
<td>A right triangle has a 71° angle. Find the measure of the other two angles.</td>
<td>9.1</td>
<td>90°, 19°</td>
</tr>
<tr>
<td>224.</td>
<td>Given that ( \angle a = 45° ) and ( \angle b = 60° ), find the measure of angle ( x ).</td>
<td>9.1</td>
<td>165°</td>
</tr>
<tr>
<td></td>
<td>[Diagram showing ( x ), ( a ), and ( b )]</td>
<td></td>
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</tr>
<tr>
<td>225.</td>
<td>Given that ( \overrightarrow{AO} \perp \overrightarrow{OB} ), express in terms of ( x ) the number of degrees in ( \angle AOC ).</td>
<td>9.1</td>
<td>90 - 2x</td>
</tr>
<tr>
<td></td>
<td>[Diagram showing ( A ), ( B ), ( O ), and ( C ) with ( 2x )]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>226.</td>
<td>Name the polygon that has seven sides.</td>
<td>9.1</td>
<td>Heptagon</td>
</tr>
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<td>Question</td>
<td>Description</td>
<td>Reference</td>
<td>Answer</td>
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<tr>
<td>227.</td>
<td>Name the triangle that has three equal sides.</td>
<td>9.1</td>
<td></td>
</tr>
<tr>
<td>228.</td>
<td>Find the perimeter of a triangle with sides 21.3 cm, 17.4 cm, and 14.8 cm.</td>
<td>9.3</td>
<td>53.5 cm</td>
</tr>
<tr>
<td>229.</td>
<td>Find the circumference of a circle with a radius of 6 cm. Use $\pi \approx 3.14$.</td>
<td>5.3</td>
<td>37.68 cm</td>
</tr>
<tr>
<td>230.</td>
<td>Find the exact circumference of a circle with a diameter of 35 ft.</td>
<td>5.3</td>
<td>35 $\pi$</td>
</tr>
<tr>
<td>231.</td>
<td>Find the perimeter of a rectangle with a length of 3 m and a width of 0.75 m.</td>
<td>9.3</td>
<td>7.5 m</td>
</tr>
<tr>
<td>232.</td>
<td>Find the area of a right triangle with base 5 cm and a height of 2.6 cm.</td>
<td>9.4</td>
<td>6.5 cm$^2$</td>
</tr>
<tr>
<td>233.</td>
<td>Find the area of a square with a side of 7 ft.</td>
<td>9.4</td>
<td>49 ft$^2$</td>
</tr>
<tr>
<td>234.</td>
<td>Find the area of a rectangle with length of 25 in. and a width of 13 in.</td>
<td>9.4</td>
<td>325 in$^2$</td>
</tr>
<tr>
<td>235.</td>
<td>Find the exact area of a circle with a diameter of 26 cm.</td>
<td>9.4</td>
<td>169 $\pi$ cm$^2$</td>
</tr>
<tr>
<td>236.</td>
<td>Find the area of a trapezoid shown in the figure.</td>
<td>9.4</td>
<td>33 $m^2$</td>
</tr>
<tr>
<td>237.</td>
<td>A room 11 ft by 15 ft is to be carpeted. Find the number of square yards of carpet needed. Round to the nearest tenth.</td>
<td>9.4</td>
<td>18.3 yd$^2$</td>
</tr>
<tr>
<td>238.</td>
<td>Find the area of the parallelogram shown in the figure.</td>
<td>9.4</td>
<td>102 $m^2$</td>
</tr>
<tr>
<td>239.</td>
<td>Find the unknown side of the triangle. Round to the nearest hundredth.</td>
<td>6.5</td>
<td>8.25 in.</td>
</tr>
</tbody>
</table>
240. A ladder 10 m long is leaning against a building. How high on the building will the ladder be when the bottom of the ladder is 4 m from the building? Round to the nearest thousandth.

![Diagram of a ladder leaning against a building]

<p>| | | | |</p>
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<tbody>
<tr>
<td>240.</td>
<td>A ladder 10 m long is leaning against a building. How high on the building will the ladder be when the bottom of the ladder is 4 m from the building? Round to the nearest thousandth.</td>
<td>6.5</td>
<td>9.165 m</td>
</tr>
</tbody>
</table>

241. Find the ratio of the corresponding sides for the similar triangles.

![Diagram of similar triangles]

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<tbody>
<tr>
<td>241.</td>
<td>Find the ratio of the corresponding sides for the similar triangles.</td>
<td>6.5</td>
<td>$\frac{1}{3}$</td>
</tr>
</tbody>
</table>

242. Triangles $ABC$ and $DEF$ are similar. Find side $AC$.

![Diagram of similar triangles]

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<tbody>
<tr>
<td>242.</td>
<td>Triangles $ABC$ and $DEF$ are similar. Find side $AC$.</td>
<td>6.5</td>
<td>4 cm</td>
</tr>
</tbody>
</table>

243. Triangles $ABC$ and $DEF$ are similar. Find the perimeter of triangle $ABC$.

![Diagram of similar triangles]

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<tbody>
<tr>
<td>243.</td>
<td>Triangles $ABC$ and $DEF$ are similar. Find the perimeter of triangle $ABC$.</td>
<td>6.5</td>
<td>15 cm</td>
</tr>
</tbody>
</table>

244. Find the perimeter. Use $\pi \approx 3.14$.

![Diagram of a rectangle with a semicircle cut out]

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</thead>
<tbody>
<tr>
<td>244.</td>
<td>Find the perimeter. Use $\pi \approx 3.14$.</td>
<td>5.3</td>
<td>95.98 m</td>
</tr>
<tr>
<td>245.</td>
<td>Find the area. Use $\pi \approx 3.14$.</td>
<td>9.4</td>
<td>706.08 cm$^2$</td>
</tr>
<tr>
<td>------</td>
<td>---------------------------------</td>
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<th>246.</th>
<th>Find the area of the concrete driveway with measurements shown.</th>
<th>9.4</th>
<th>1,140 ft$^2$</th>
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