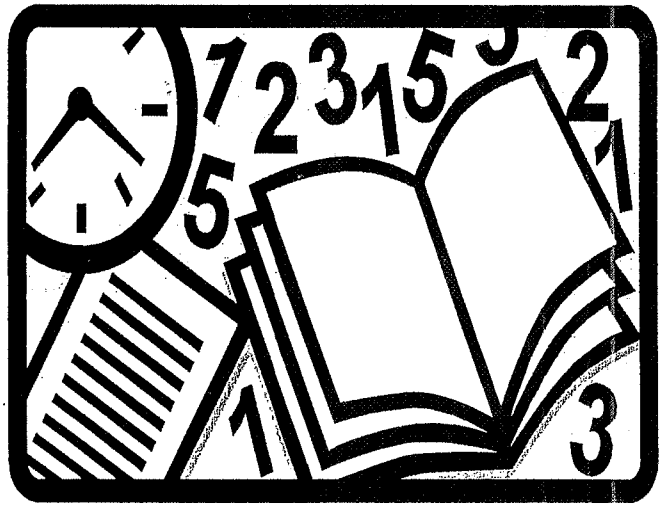
24 for 6th Gr GT

# What Students Should Know When They Begin Pre-Algebra Mathematics

6th Gr. GT Math

## A Summer Guide for Parents and Students



Warehouse # 82-01-260

# FOREWORD

Quality curriculum is basic to the educational program in The Howard County Public School System, providing the structure and the substance of what is taught to all students. The body of knowledge in any area is virtually infinite in that it is constantly changing and expanding as "new" knowledge is developed and "old" knowledge is refined. Thus, any attempt to set forth a definitive curriculum guide has inherent limitations. Nevertheless, it is important that a school system have a structure for the instructional program that provides direction, focus, flexibility, and state-of-the-art thinking about each content area.

We recognize that no body of knowledge in any subject area is discrete; knowledge is overlapping and interrelated. Thus, although there is a curriculum guide for each subject, curriculum is, and should be, interdisciplinary in focus. Students need to be taught to make connections between and among disciplines. They also need to understand the global nature of the world in which they live, respecting and drawing on the richness of a diverse society. Accordingly, curricula are written so that every child, in every classroom in The Howard County Public School System sees himself or herself in the materials used and the lessons taught. Each classroom must reflect its place as a multiethnic, multicultural microcosm of the world.

This guide has been developed by a team of teachers and other staff within the school system, drawing from the vast body of their collective experience in working with students. While they share both the pride and the responsibilities of authorship, it is our feeling that this guide and the others like it represent the essential elements of what education is in The Howard County Public School System.

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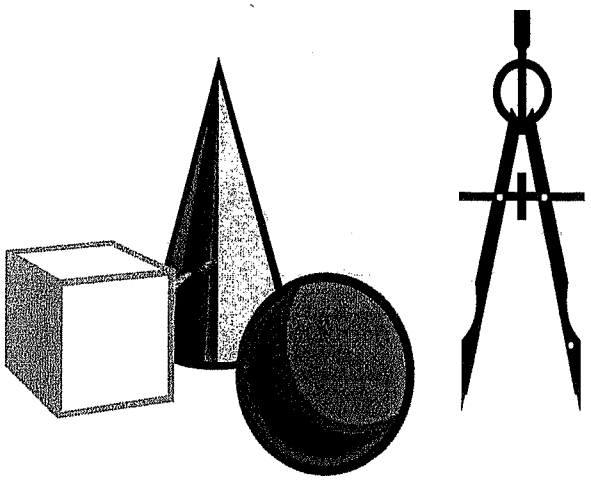
# ACKNOWLEDGEMENTS

The *Summer Guide for Parents and Students (What Students Should Know When They Begin Pre-Algebra Mathematics)* is the result of ongoing planning and development by the staff of the Howard County Secondary Mathematics Office. Charles Koppelman, Roberta Girardi, Dale Harriman, and Mike Reese were the authors and editors of this guide under the direction of Nancy Metz. Special appreciation is extended to:

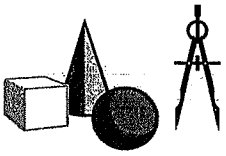
Angie Taury Typist and Graphics Personnel

Table of Contents





# INTRODUCTION



Teachers and administrators in the Howard County Public School System actively encourage parents and community members to engage in children's learning. This guide *What Students Should Know When They Begin Pre-Algebra Mathematics – A Summer Guide for Parents and Students* has been developed to assist friends, family, and school system and community members as a resource in working together to help students reach their full potential.

The booklet has been designed to provide a basic understanding to family and students of the mathematics knowledge needed by students entering a grade 8 mathematics course. The Howard County Office of Mathematics recommends that students complete this booklet during the summer and **bring it with work shown to school on the first day of grade 8**. Assistance with the booklet will be provided at the beginning of the school year. Completion of this booklet over the summer between grades 7 and 8 will be of great value to helping students successfully meet the academic challenges awaiting them in middle and high school mathematics. These challenges include

- Quarterly assessments in Prealgebra
- The Maryland State Assessments in mathematics given in grades 8, and 10
- The Maryland High School Assessments given to algebra and geometry students.

Included in this booklet are the following:

- A table consisting of 7th grade Middle School Math II "on-grade level" instructional objectives with appropriate clarifying examples and cross-references to the Maryland Voluntary State Curriculum and mathematics problems provided for student practice in the booklet,
- A set of sample questions emphasizing different objectives from the grade 7 Middle School Math II curriculum,
- Answers to the sample questions.

Directions:

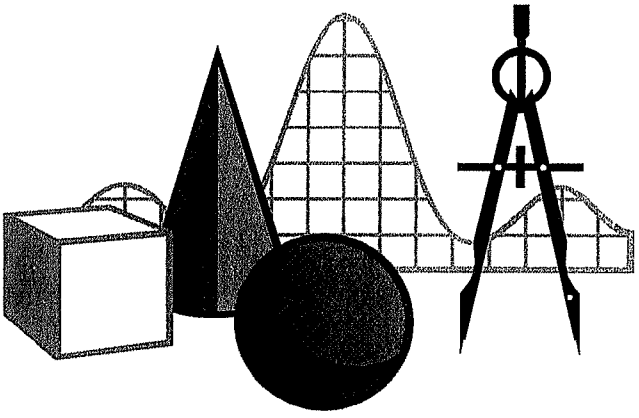
- Students are requested to work in pencil and <u>show their work</u> in the booklet or on lined paper to accompany the booklet. They should check their answers using the key provided and, if possible, correct the work for problems solved incorrectly. Round answers to the nearest tenth.
- Sample problems for objectives followed by an asterisk (*) should be completed <u>without</u> the use of a calculator.

Families are encouraged to use the many resources made available by the Howard County Office of Mathematics and other community resources. Among these are:

- The Secondary Mathematics website (http://www.howard.k12.md.us:16080/math/ and click on Secondary Mathematics Internet Resources) has links to dozens of mathematics related websites containing activities, tutorials, games, puzzles and lists of resources at every level.

- The Howard County Public Library's website (http://www.howa.lib.md.us/) allows free access to *Live Homework Help*, offering assistance at all levels of secondary mathematics.

# GRADE 7 MATHEMATICS GOALS



# GRADE 7 MATHEMATICS GOALS

## UNIT I: Variables, Patterns, Expressions, and Number Theory

**Goal:** The student will demonstrate the ability to represent, model, and analyze mathematical problems.

| **Instructional Objective(s)**<br>The student will be able to: | **Clarifying Examples** | **Voluntary State Curriculum Indicator** | **Practice Exercises** |
|---|---|---|---|
| a. Simplify expressions by applying order of operations. * | a. Evaluate the expression by applying the order of operations: $54 \div (4+2) - (10-3)$ | 1B1c | 1, 2 |
| b. Estimate and calculate powers and square roots of numbers to solve problems. * | b. The area of a square is 81 sq. inches. What are the dimensions of the square? | 6C1c | 3 – 9 |
| c. Read, write, and represent whole numbers using exponential notation. | c. Express in exponential notation: 285 | 6A1a | 10, 11 |
| d. Express decimals using expanded form. | d. Express in expanded form: 55.9 | 6A1b | |
| e. Add, subtract, multiply, and divide positive fractions and mixed numbers. * | e. Add: $4\frac{1}{3} + \frac{5}{6}$ | 6C1b, 6C1d | 12 – 23 |
| f. Evaluate algebraic expressions involving whole numbers, decimals, and fractions.* | f. Evaluate the expression for $x = 3$ and $y = 5$: $6x - 4y$ | 1B1b | 24 – 26 |
| g. Select and apply strategies, including estimation, to solve problems with fractions and decimals. | g. Keisha paid \$4.50 admission to the amusement park, and \$.75 for each ride. She went on 12 rides. The total amount she spent, T is represented by the equation T = 4.50 + .75R, where R = the number of rides Keisha went on. Use the equation to find the total amount Keisha spent. | 6C1b | 27 – 35 |

| | | | |
|---|---|---|---|
| h. Multiply and divide by powers of ten. | h. Solve the equation $P = 3.81 \times 10^5$ | 6C1b | 36, 37 |
| i. Use the laws of exponents to simplify expressions. | i. Simplify using the laws of exponents: $7^2 \times 7^3$ | 6C1b | 38 – 40 |
| j. Express numbers in scientific notation. | j. The moon is 247,000 miles from earth. Express the distance in scientific notation. | 6A1e | 41, 42 |
| k. Identify and extend patterns and simple arithmetic or geometric sequences. | k. Find the next 3 terms in each sequence: 7, 11, 15, 19, ___, ___, ___ | 1A1a, 1A1b | 43 – 47 |

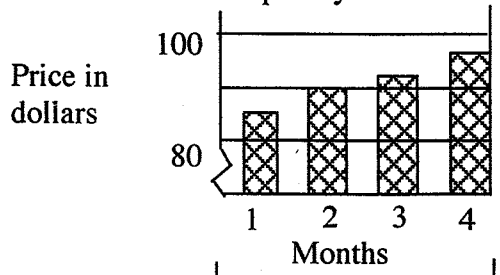
## UNIT II: Data Analysis

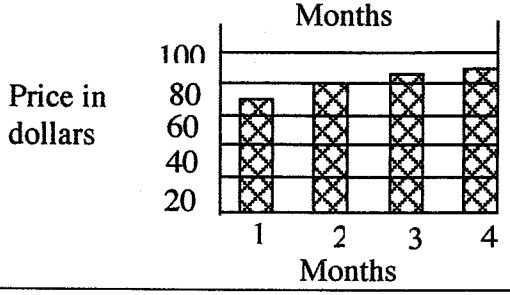
**Goal:** The student will demonstrate the ability to collect and use data to make decisions and predictions.

<table>
<tr><th>Instructional Objective(s)<br>The student will be able to:</th><th>Clarifying Examples</th><th>Voluntary State Curriculum Indicator</th><th>Practice Exercises</th></tr>
<tr><td>a. Interpret and calculate mean, median, mode, and range of a data set.</td><td>a. The table shows a set of scores on a math quiz. Calculate the mean, median, mode, and range of the quiz grades.
<table>
<tr><th>Student</th><th>Score</th></tr>
<tr><td>John</td><td>18</td></tr>
<tr><td>Alan</td><td>22</td></tr>
<tr><td>Mary</td><td>23</td></tr>
<tr><td>Tony</td><td>20</td></tr>
<tr><td>Bret</td><td>19</td></tr>
<tr><td>Mica</td><td>14</td></tr>
<tr><td>Jenny</td><td>17</td></tr>
</table></td><td>4B2a</td><td>48 – 52</td></tr>
<tr><td>b. Compare measures of central tendency to determine which is most appropriate.</td><td>b. The number of students in each of ten 7th grade classes are: 18, 28, 23, 27, 19, 19, 28, 29, 30, 29. Calculate the mean, median, mode, and range of the class sizes. Which number would you use to convince the Principal that class sizes are too large?</td><td>4A1a</td><td>53</td></tr>
<tr><td>c. Organize, display, analyze, and interpret data from tables, graphs, and charts.</td><td>c. Construct a stem and leaf plot for the set of data in the table below:
<table>
<tr><td>25</td><td>33</td><td>60</td><td>28</td><td>29</td><td>35</td><td>46</td></tr>
<tr><td>51</td><td>55</td><td>39</td><td>42</td><td>45</td><td>20</td><td>42</td></tr>
</table></td><td>4A1a</td><td>54 – 58</td></tr>
</table>

| | | | |
|---|---|---|---|
| d. Organize and display data in back-to-back stem and leaf plots. | d. The tables show the daily high temperatures for the first two weeks of April, 2003 and April, 2004. Construct a back-to-back stem and leaf plot for the data. | 4A1a | 59, 60 |
| e. Identify factors leading to faulty interpretation or misrepresentation of data. | e. The graphs shown each represent the price of a particular item over the same four month period. Choose which graph is misleading. Use the language of mathematics to explain your selection. | 4B1a | 61 – 64 |

| April, 2003 | | | | April, 2004 | | | |
|---|---|---|---|---|---|---|---|
| 66 | 68 | 72 | 64 | 59 | 57 | 48 | 52 |
| 62 | 59 | 57 | 61 | 55 | 60 | 63 | 63 |
| 65 | 68 | 71 | 75 | 65 | 68 | 70 | 73 |
| 73 | 70 | | | 74 | 71 | | |



## UNIT III: Integers

**Goal:** The student will demonstrate the ability to describe, represent, and apply numbers and their relationships.

| **Instructional Objective(s)**<br>The student will be able to: | **Clarifying Examples** | **Voluntary State Curriculum Indicator** | **Practice Exercises** |
|---|---|---|---|
| a. Read, write, and represent integers. * | a. Write the integer –352 in words. | 6C1a | 65, 66 |
| b. Determine absolute value of integers. * | b. Evaluate the expression for a = -3 and b = 5:<br>$\lvert a - 2b \rvert$ | 6C1a | 67, 68 |
| c. Compare, order, and describe fractions, decimals, percents, and integers. * | c. Compare the pair of numbers using =, <, or >:<br>$\frac{3}{4} \bigcirc \frac{7}{8}$ | 6C1a, 6A1d | 69 – 75 |
| d. Add, subtract, multiply, and divide integers. * | d. Evaluate the expression: $-15 \div (-3)$ | 6C1a | 76 – 84 |
| e. Simplify and evaluate expressions involving integers. * | e. Evaluate the expression for m = -3 and n = 5:<br>$3m - 4n$ | 6C1a | 85, 86 |
| f. Explain and apply number relationships using mathematical properties to justify steps in simplifying algebraic expressions. | f. Justify each step shown in the simplification of the expression $3(5+x) - 2$<br>1. $15 + 3x - 2$<br>2. $15 + 3x + -2$<br>3. $15 + -2 + 3x$<br>4. $13 + 3x$ | 6C1e | |

## UNIT IV: Exploring Equations, Inequalities, and Functions

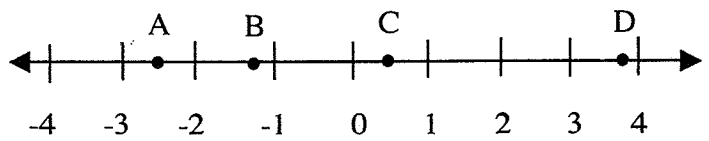
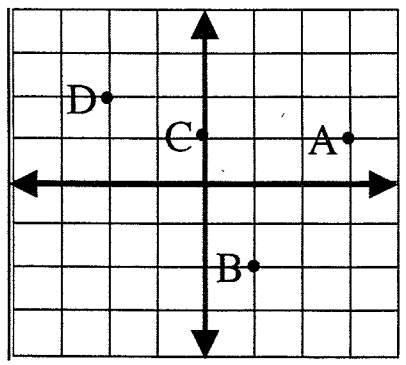
**Goal:** The student will demonstrate the ability to write and solve equations and inequalities that model authentic contexts.

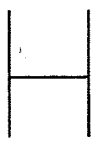
| **Instructional Objective(s)**<br>The student will be able to: | **Clarifying Examples** | **Voluntary State Curriculum Indicator** | **Practice Exercises** |
|---|---|---|---|
| a. Write expressions, equations, and inequalities to represent relationships. | a. Express using algebraic symbols using N as the number: 3 less than 4 times a number | 1B1a, 1B2a | 87 – 93 |
| b. Write and solve an equation that represents a real-world situation. | b. Jorge and his sister were comparing their ages. Jorge's age (in years) is 3 more than twice his sister's age.<br>• Write an equation that represents the relationship between Jorge's age and his sister's age.<br>• How old is Jorge? | 1B2a | 94, 95 |
| c. Identify equivalent equations. * | c. Which of the following are equivalent to the equation $2x + 14 = 20$?<br>(a) $2(x + 7) = 20$ (b) $2x = 6$ (c) $7x = 21$ | 1B2e | 96, 97 |
| d. Solve linear equations with one variable using mathematical properties. * | d. Solve the equation: $\frac{x}{3} - (-8) = 13$ | 1B2c | 98 – 107 |
| e. Represent functions as ordered pairs. | e. Write three ordered pairs for the function $y = 4x + 1$. | | 108, 109 |
| f. Describe how a change in one variable in a linear function affects the other variable in a table of values. | f. Complete the table. Describe how the change in x affects the value of y.<br>x \| 2x - 3 \| y<br>1 \| \| \|<br>2 \| \| \|<br>3 \| \| \| | 1B1c | 110 –113 |

| | | | |
|---|---|---|---|
| g. Simplify algebraic expressions by combining like terms. | g. Simplify the expression $8x + 2y - 3x + xy$ | 1B1d | 114, 115 |
| h. Solve linear inequalities with one variable using mathematical properties. * | h. Solve the inequality $3x - 4 \geq 14$ | 1B2c | 116, 117 |
| i. Identify and graph solutions of inequalities on a number line. | i. Solve the inequality and graph the solution on a number line: $2x + 10 = 8$ | 1A1d | 116, 117 |

**UNIT V: Numeric and Graphic Representations of Relationships**

**Goal:** The student will demonstrate the ability to describe, graph and analyze numeric relationships.

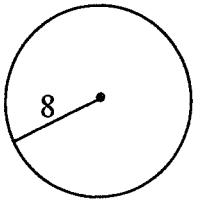
| **Instructional Objective(s)**<br>The student will be able to: | **Clarifying Examples** | **Voluntary State Curriculum Indicator** | **Practice Exercises** |
|---|---|---|---|
| a. Graph rational numbers on a number line. | a. Match the letter of each point on the number line with the following numbers: $\frac{1}{2}, 3\frac{3}{4}, -2.5, -\frac{5}{4}$<br>  <br> | 1C1a | 117, 118 |
| b. Graph ordered pairs in the four quadrants of a coordinate plane. | b.<br>  <br><br>List the coordinates of each point.<br>A _____<br>B _____<br>C _____<br>D _____ | 1C1b | 119 – 122 |
| c. Graph linear equations in one operation on the coordinate plane. | c. Graph the equation $y = 2x + 5$. | 1C1c | 123 – 125 |

<table>
<tr>
<td>d. Identify and describe the change represented in a table of values.</td>
<td>d. Complete the table. Describe how the change in x affects the value of y.
<table>
<tr><th>x</th><th>4 - x</th><th>y</th></tr>
<tr><td>1</td><td></td><td></td></tr>
<tr><td>2</td><td></td><td></td></tr>
<tr><td>3</td><td></td><td></td></tr>
</table></td>
<td>1C2a</td>
<td>126</td>
</tr>
<tr>
<td>e. Describe the rate of change of a linear relationship by a table of values and a graph.</td>
<td>e. The table shows the average height, in inches, of American men from 1900 to 2000.
<ul><li>Graph the ordered pairs (year, height)</li><li>Write a statement that describes the trend over time.</li></ul>
<table>
<tr><th>Year</th><th>Height</th></tr>
<tr><td>1900</td><td>65</td></tr>
<tr><td>1925</td><td>66.4</td></tr>
<tr><td>1950</td><td>67</td></tr>
<tr><td>1975</td><td>67.8</td></tr>
<tr><td>2000</td><td>69</td></tr>
</table></td>
<td>1C2b</td>
<td>126, 127</td>
</tr>
<tr>
<td>f. Describe and plot the results of transformations such as translations, reflections, and rotations.</td>
<td>f. A figure has vertices P(2,1), Q(4,1), and R(5,4). Graph the figure and the image of the figure after a rotation of 90° counterclockwise.</td>
<td>2E1a</td>
<td>128 – 131</td>
</tr>
<tr>
<td>g. Identify and describe transformations that result in rotational and reflectional symmetry.</td>
<td>g. Draw all lines of symmetry for the letter H below.
 </td>
<td>1E1b</td>
<td>132</td>
</tr>
</table>

## UNIT VI: Proportional Reasoning and Percent

**Goal:** The student will demonstrate the ability to use problem-solving strategies and technology to solve real-world problems involving ratios, proportions, and percent.

| **Instructional Objective(s)**<br>The student will be able to: | **Clarifying Examples** | **Voluntary State Curriculum Indicator** | **Practice Exercises** |
|---|---|---|---|
| a. Determine equivalent ratios, decimals, and percents. * | a. Tell whether the ratios are equivalent. Show your answer by simplifying. $\frac{64}{80}$ and $\frac{20}{25}$ | 6A1c | 133 – 143 |
| b. Use proportions and rates involving decimals and percents to solve problems. | b. Kelly can run 90 feet in 20 seconds. At that rate, how many feet can she run in 2 minutes? | | 144 – 146 |
| c. Determine ratios, rates, and unit rates in the context of a problem. | c. One 16 ounce carton of ice cream costs $2.50. A 24 ounce of the same ice cream costs $4.00. Which is the better buy for money. Use the language of mathematics to explain your selection. | | 147 |
| d. Determine percent of a number. | d. Find the number an round to the nearest tenth: 45% of 80. | 6C1f | 148 – 150 |
| e. Apply the concepts of ratios, rates, and percents to real-world problems including discount, commission, percent of increase and decrease, sales tax, and simple interest. | e. Mr. Benitez borrows $9,000 for 3 years at 10.5% simple interest to pay for his car. How much will he have to pay back, including interest? | 6C3a, 6C3b, 6C3c | 151 - 160 |
| f. Estimate pi using physical models. | | 3C1c | |

<table>
<tr>
<td>g. Determine the circumference and area of a circle.</td>
<td>g. Find the circumference and area of the circle shown. Use $\pi = 3.14$.<br>  <br></td>
<td></td>
<td>161 – 164</td>
</tr>
<tr>
<td>h. Organize and display data using circle graphs.</td>
<td>h. 100 people were asked their favorite season of the year. Their responses appear in the table. Use the data in the table to construct a circle graph.
<table>
<tr><th>Season</th><th>Number of people</th></tr>
<tr><td>Fall (Autumn)</td><td>25</td></tr>
<tr><td>Winter</td><td>15</td></tr>
<tr><td>Spring</td><td>40</td></tr>
<tr><td>Summer</td><td>20</td></tr>
</table></td>
<td>4A1b</td>
<td>165</td>
</tr>
</table>

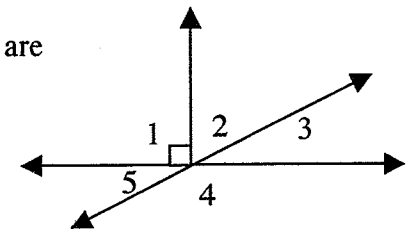
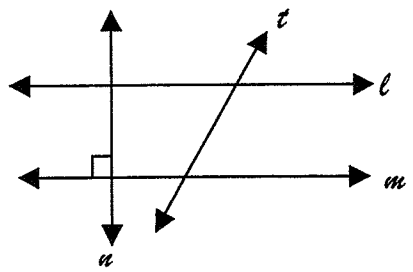
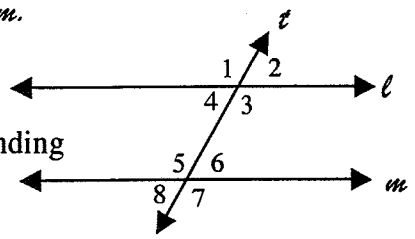
## UNIT VII: Using Probability

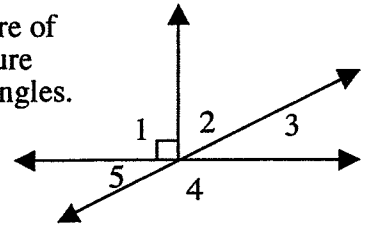
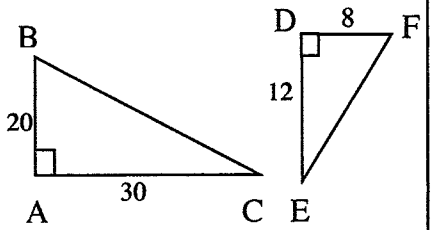
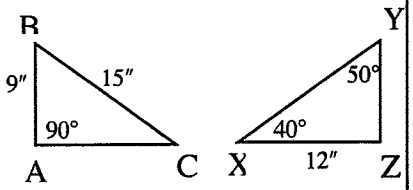
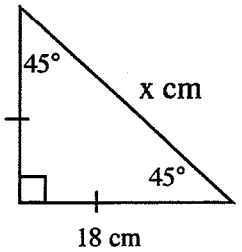
**Goal:** The student will demonstrate the ability to use experimental methods and theoretical reasoning to determine probabilities to make predictions.

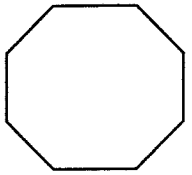
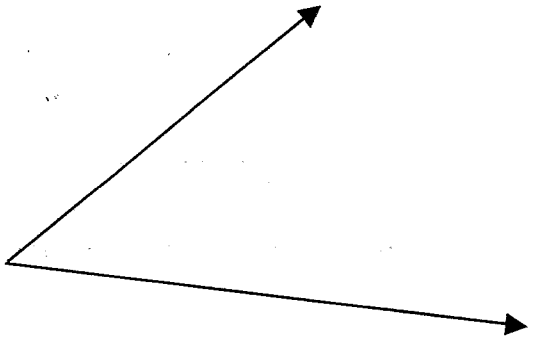
<table>
<tr><th>Instructional Objective(s)<br>The student will be able to:</th><th>Clarifying Examples</th><th>Voluntary State Curriculum Indicator</th><th>Practice Exercises</th></tr>
<tr><td>a. Predict the theoretical probability of an event and conduct an experiment or simulation to find the experimental probability.</td><td>a. The table shows results of an experiment in which a coin was tossed.<br>a. What is the theoretical probability of tossing a coin and getting tails.<br>b. Find the experimental probability of tossing a coin and getting tails for this experiment.
<table>
<tr><th>Outcome</th><th>Tally</th><th>Frequency</th></tr>
<tr><td>Heads</td><td>~~IIII~~ ~~IIII~~ IIII</td><td>14</td></tr>
<tr><td>Tails</td><td>~~IIII~~ ~~IIII~~ II</td><td>12</td></tr>
</table></td><td>5C2</td><td>166 – 171</td></tr>
<tr><td>b. Compare results of theoretical probability and experimental probability.</td><td>b. If a coin is tossed 26 times, how many times would you expect the result to be Heads? Use the language of mathematics to explain your answer.</td><td>5C3, 5C4</td><td>168</td></tr>
<tr><td>c. Express the probability of an event as a ratio, decimal, or percent.</td><td>c. If a card is picked at random from an ordinary deck of playing cards, what is the probability that the card will be a Club. Express our answer as a percent.</td><td>5C1a, 5A1a</td><td>166 – 168</td></tr>
<tr><td>d. Find the probability of dependent events.</td><td>d. There are 5 red marbles and 5 blue marbles in a bag. Two marbles are removed from the bag. What is the probability that both are red?</td><td>5B1a</td><td>169</td></tr>
<tr><td>e. Determine outcomes of events using counting techniques and permutations.</td><td>e. How many ways can 5 people line up for a race?</td><td></td><td>170 – 174</td></tr>
</table>

## UNIT VIII: Plane Geometric Figures

**Goal:** The student will demonstrate the ability to apply the properties of one-, two-, and three-dimensional geometric figures to describe, reason, and solve problems about shape, size, position, and motion of objects.

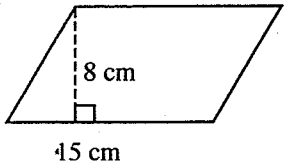
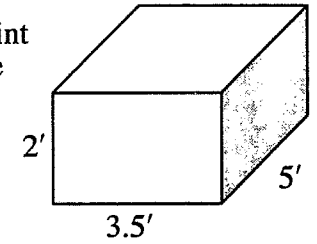
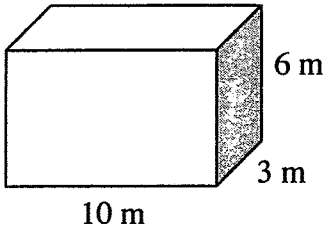
| **Instructional Objective(s)**<br>The student will be able to: | **Clarifying Examples** | **Voluntary State Curriculum Indicator** | **Practice Exercises** |
|---|---|---|---|
| a. Identify and describe angles formed by intersecting lines, line segments, and rays. | a. Identify angles that are<br>• Supplementary<br>• Complementary<br>• Vertical<br>• Adjacent<br>  | 2A1a | 175, 176 |
| b. Identify parallel, perpendicular, and intersecting lines. | b. Name<br>• Two parallel lines<br>• Two perpendicular lines<br>  | | 177 |
| c. Identify angles formed when two parallel lines are cut by a transversal. | c. Line ℓ is parallel to line m.<br>Name<br>• One pair of alternate interior angles<br>• One pair of corresponding angles<br>• One air of alternate exterior angles<br>  | 2A1b | 178 - 182 |

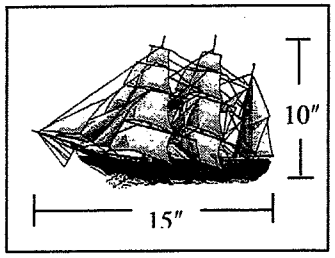
| | | | |
|---|---|---|---|
| d. Identify and determine missing angle measures for angles formed by intersecting lines, line segments, and rays. | d. In the diagram, the measure of $\angle 5$ is 28°. Find the measure of each of the other four angles.   | 2A2b | 178 - 183 |
| e. Identify and describe similar polygons and their corresponding parts. | e. Tell whether $\Delta ABC$ and $\Delta DEF$ are similar. Justify your answer.   | 2D1b | 184 – 187 |
| f. Identify, describe, and represent similar and congruent figures. | f. $\Delta ABC$ and $\Delta ZYX$ are congruent. Find the missing angle measures and the missing side lengths.   | 2D1a | 188, 189 |
| g. Identify the parts of right triangles and describe the relationship between the legs and the hypotenuse. | g. Determine the measure of the hypotenuse. Round to the nearest whole number.   | 2A2c | 190 |

| | | | |
|---|---|---|---|
| h. Determine a missing angle measure using the sum of the interior angles of polygons. | h. In the octagon shown, four of the angles each measure 130° and three others each measure 138°. What is the measure of the eighth angle?  | 2A2c | 191, 192 |
| i. Construct geometric figures using a variety of construction tools. | i. Copy angle BAC on another paper and construct the angle bisector.  | 2C1a, 2C1b, 2C1c | |

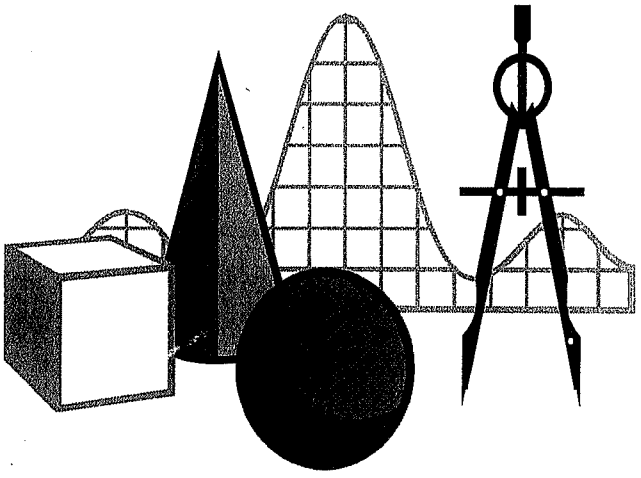
## UNIT IX: Applications in Measurement

**Goal:** The student will demonstrate the ability to identify attributes and units, and apply a variety of techniques, tools, and technology for determining measure.

| **Instructional Objective(s)**<br>The student will be able to: | **Clarifying Examples** | **Voluntary State Curriculum Indicator** | **Practice Exercises** |
|---|---|---|---|
| a. Estimate and determine the area of quadrilaterals. | a. Calculate the area of the parallelogram. Round to the nearest tenth.<br>  <br> | 3C1a | 193 – 194 |
| b. Estimate and determine surface area of geometric solids. | b. How many square feet of paint are needed to paint the entire surface of the box?<br>  <br> | 3C1b | 195 |
| c. Estimate and determine the volume of a rectangular and triangular prism. | c. Calculate the volume of the prism. Round to the nearest tenth.<br>  <br> | 3C1d | 196 |

| | | | |
|---|---|---|---|
| d. Determine missing dimensions for a figure using a scale. | d. Larry is building a scale model of the boat in the picture. If the model is 36" long, how high is the model?   | 3C2a | 197, 198 |
| e. Determine the distance between two points using drawing and a scale. | e. New York City and Washington DC are about 250 miles apart. If a map showing both cities uses a scale $\frac{1}{4}$ in: 25 miles, how far apart will the two cities be on the map? | 3C2b | 199, 200 |

# PRACTICE PROBLEMS



1. Simplify

$25 \div 5 \times 5 + 8 - 5$

A. 4 B. 28 C. 3 D. 8

2. Simplify

$5 \times 11 + 2 - 10 \div 2$

3. Evaluate $v^3$ if $v = 5$.

A. 125 B. 15 C. 8 D. 243

4. Evaluate $c^4$ if $c = 4$.

5. Find $3^3 + 4^3$.

A. 91 B. 18 C. 21 D. 108

6. Simplify $\sqrt{49}$

A. 7 B. 70 C. 0.7 D. 49

7. Which is equivalent to 6?

A. $\sqrt{64}$ B. $\sqrt{36}$ C. $\sqrt{12}$ D. $\sqrt{49}$

8. The square of a number is 169. What is the number?

9. $\sqrt{27}$ is between what two consecutive whole numbers?

A. 26 and 28 B. 4 and 5 C. 6 and 7 D. 5 and 6

10. Write 930 in scientific notation.

11. Write 62,000 in scientific notation.

12. Solve. Write the solution in simplest form.

$$\frac{4}{15} + \frac{2}{9} = x$$

A. $\frac{23}{45}$ B. $\frac{1}{4}$ C. $\frac{22}{45}$ D. $\frac{6}{24}$

Solve. Write the solution in simplest form.

13. $y = \frac{5}{6} - \frac{1}{12}$

A. $\frac{3}{4}$ B. $\frac{5}{72}$ C. $\frac{1}{18}$ D. $\frac{11}{12}$

14. $\frac{11}{12} - \frac{1}{8} = x$

15. Add. Write the sum in simplest form.

$$1\frac{4}{5} + 8\frac{1}{2}$$

A. $6\frac{1}{7}$ B. $9\frac{5}{7}$ C. 10 D. $10\frac{3}{10}$

16. Subtract. Write the difference in simplest form.

$$2\frac{1}{7} - 1\frac{5}{9}$$

A. $1\frac{2}{21}$ B. $1\frac{4}{63}$ C. $\frac{23}{63}$ D. $\frac{37}{63}$

17. Multiply. Write the product in simplest form.

$$\frac{1}{8} \times \frac{3}{4}$$

A. $\frac{3}{32}$ B. $\frac{1}{6}$ C. $\frac{32}{3}$ D. 24

18. Solve. Write the solution in simplest form.

$$x = \frac{6}{5} \times \frac{1}{66}$$

19. Multiply. Write the product in simplest form.

$$1\frac{1}{4} \times 4\frac{2}{3}$$

Divide. Write the quotient in simplest form.

20. $\frac{4}{9} \div \frac{36}{8}$

A. $\frac{2}{9}$ B. 2 C. $\frac{9}{4}$ D. $\frac{8}{81}$

21. $\frac{2}{9} \div \frac{8}{7}$

22. $1\frac{1}{2} \div 3\frac{1}{3}$

A. $\frac{9}{20}$ B. 5 C. $3\frac{1}{6}$ D. $\frac{9}{2}$

23. $2\frac{3}{8} \div 4\frac{7}{9}$

24. Evaluate $8q + 9r$ when $q = 2$ and $r = 3$.

A. 11 B. 5 C. 17 D. 43

25. Evaluate $3v - w$ if $v = 9$ and $w = 10$.

A. 37 B. 17 C. 3 D. 21

26. Evaluate $5t + u$ if $t = 7$ and $u = 5$.

27. Mandi has $\frac{1}{3}$ cup flour in one container and $\frac{7}{8}$ cup in another container. About how much flour does she have in all?

A. 1 cup B. $3\frac{1}{2}$ cups C. 4 cups D. 3 cups

28. Waymond cut $6\frac{1}{2}$ feet off a $9\frac{1}{10}$ foot board. About how long is the piece of board that was left?

A. 2 feet B. $3\frac{1}{2}$ feet C. 4 feet D. 3 feet

29. Kira's muffin recipe calls for 3/4 cup of sugar. About how much sugar does she need to triple the recipe?

A. 2 cups B. $\frac{1}{2}$ cups C. 3 cups D. 4 cups

30. About how many $\frac{7}{8}$ yard pieces of material can Geoff cut from a $4\frac{5}{6}$ yard piece of material?

A. 5 pieces B. 4 pieces C. 2 pieces D. 3 pieces

31. Cristina had $55 to spend on camp supplies. She decides to buy a flashlight for $5.95, a sleeping bag for $19.05, bug repellent for $2.19, and suntan lotion for $5.89. Which additional item will she have enough money to buy?

A. a pair of shorts for $25.95
B. a backpack for $32.98
C. a pair of hiking boots for $32.05
D. a T-shirt for $20.59

32. The Martinez family spent $2,600 on their 9-day vacation. Which is a reasonable estimate of the average amount of money they spent each day?

A. $350 B. $200 C. $300 D. $250

33. The Video Store is selling a select group of videos for $12.99 each. Which is reasonable for the greatest number of videos that can be purchased for $55?

A. 2 videos B. 4 videos C. 5 videos D. 3 videos

34. Drew earns $453 a week. He is paid every 4 weeks. He expects to get a raise of $24 a week this summer. Which is a reasonable estimate of the amount he will be paid every 4 weeks if he gets the expected raise?

A. $1,900 B. $1,500 C. $1,800 D. $1,600

35. Starla has \$120 to spend on computer supplies. She decides to buy a printer cartridge for \$19.99, 2 boxes of disks for \$15.89 each, and a mouse for \$49.19. She thinks she will have enough left over to buy a keyboard for \$38. Does this seem reasonable? Explain your reasoning.

36. Multiply: $0.043 \times 10{,}000$

37. $845 \times 0.01 =$

    A. 8.45 B. 845 C. 84.5 D. 0.845

38. Evaluate $2^5$.

39. Use a calculator to determine whether the sentence is true or false.

$$6^5 = 5^8$$

40. Evaluate $y^2$ if $y = 9$.

41. Write 3,530,000 in scientific notation.

    A. $35.3 \times 10^5$
    A. $3.53 \times 10^6$
    A. $353 \times 10^4$
    A. $0.353 \times 10^7$

42. Write the number in scientific notation.

    The mean distance of Mercury from the sun is about 36,000,000 miles.
    *Source: The World Almanac and Book of Facts 1999.*

    A. $36 \times 10^6$
    B. $3.6 \times 10^7$
    C. $0.36 \times 10^8$
    D. $3.6 \times 10^6$

43. Find the next number in the sequence.

    48, 72, 90...

44. Identify the sequence as arithmetic, geometric, or neither.

    2, 4, 6, 8...

    A. neither B. arithmetic C. geometric

45. Determine whether the sequence below is geometric, arithmetic, or neither.

4, 12, 20, 36…

46. What number is next in the sequence?

90, 88, 86, 84, 82, _____

A. 79 B. 80 C. 81 D. 84

47. Study the pattern below. What are the next three numbers in the pattern?


A. 14, 19, 23
B. 15, 21, 27
C. 16, 25, 36
D. 12, 15, 18

48. Find the mean of the data.

33, 21, 27, 24, 17, 37, 38, 17

A. 21 B. 26.125 C. 26.75 D. 25.5

49. So far in Spanish class, your test scores are 84, 85, 80, and 71. What score do you need on the fifth test to get an average or mean of 82?

A. 80 B. 88 C. 90 D. 91

50. Find the median of the data

3, 38, 34, 4, 37, 9, 26, 8, 36

A. 23.8333
B. 21.6667
C. 26
D. 17.5

51. Which set of numbers has a median of 8.5?

A. 19, 20, 17, 14, 10, 19
B. 15, 13, 16, 8, 10, 7
C. 11, 6, 9, 10, 5, 12
D. 9, 14, 7, 8, 5, 12

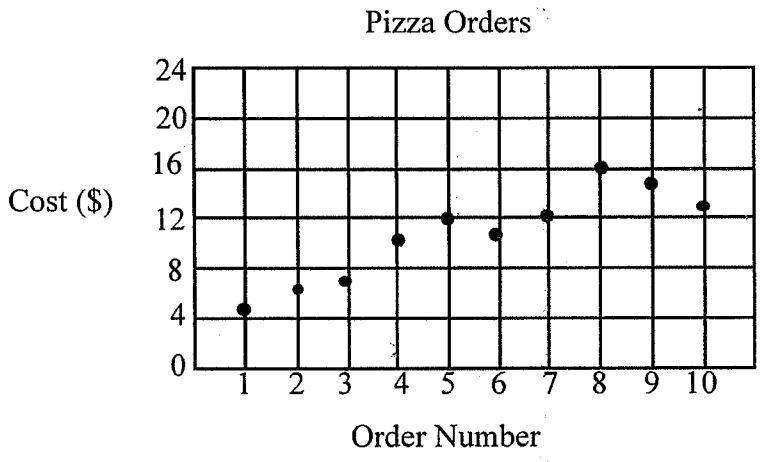
52. Given the following colors, find the mode.

red, blue, black, white, white, white

53. Allen's quiz scores this quarter on the ten quizzes he has taken are:
18, 14, 19, 17, 14, 18, 19, 17, 14, 12
Calculate the mean, median, and mode of the quiz scores. Which should Allen use to describe his performance to his parents?

54. Find the range for the set of data. Choose an appropriate scale and interval for a frequency table.
18, 22, 11, 5, 10, 15, 6, 7, 18, 35, 31, 29, 22, 10, 7

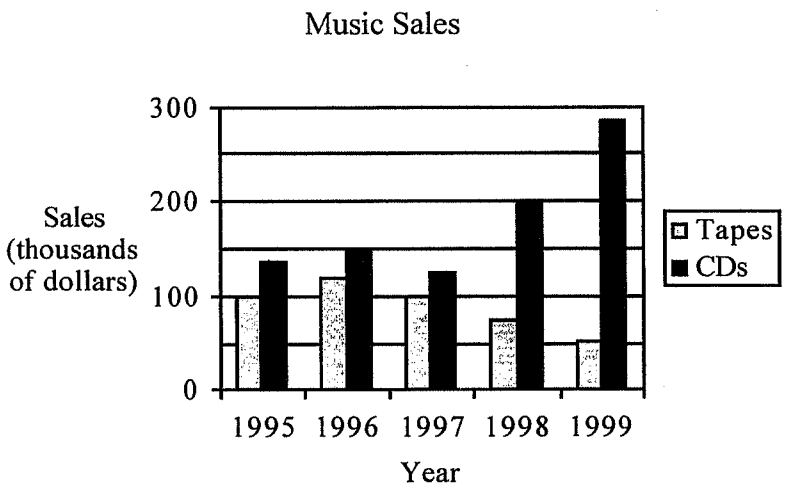
55. Maria made the graph below to show the cost of the pizza orders on Monday evening.




How many orders cost $16 or greater?

A. 27 orders
B. 3 orders
C. 8 orders
D. 1 order

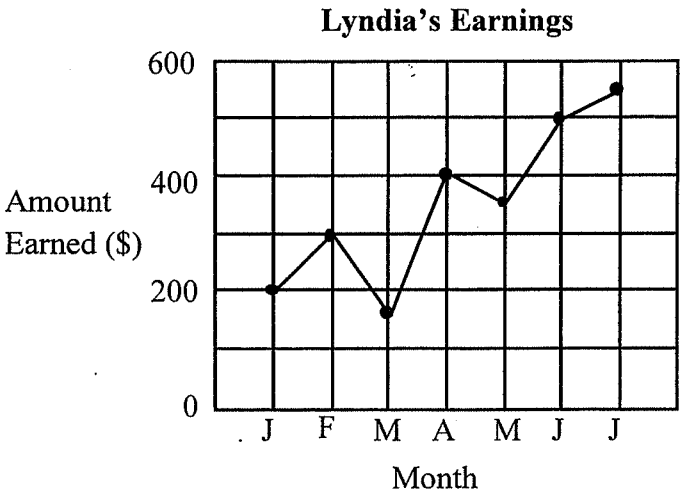
56. The manager of The Music Experience made the graph below to show the sales of tapes and CDs from 1995 to 1999.




In what year was the difference in sales the greatest?

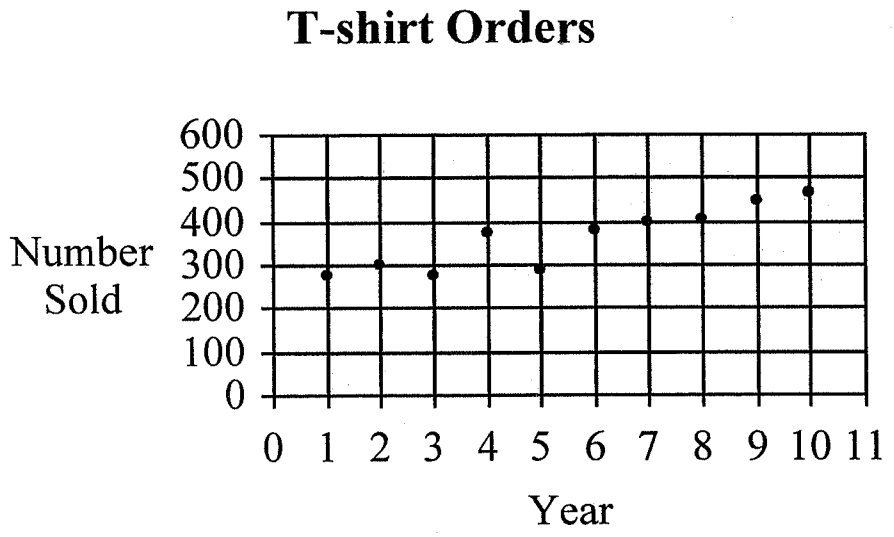
A. 1998 B. 1997 C. 1996 D. 1999

57. The line graph shows Lyndia's monthly earnings for January through July. What is a good prediction for the amount Lyndia will earn in August?




A. about $600
B. about $400
C. about $350
D. about $200

58. The scatter plot shows the number of T-shirts sold by The Shirt Makers their first 10 years in business. Predict the number of T-shirts that will be sold in the eleventh year.




59. Yvette made the following stem-and-leaf plot of the high and low temperatures for 10 days.

| Lows | Stems | Highs |
|---|---|---|
| 7 2 1 0 | 3 | 8 9 |
| 9 7 3 | 4 | |
| 7 3 0 | 5 | 6 9 8 9 |
| | 6 | 0 1 5 8 |

0 | 3 = 30° F  3 | 8 = 38° F

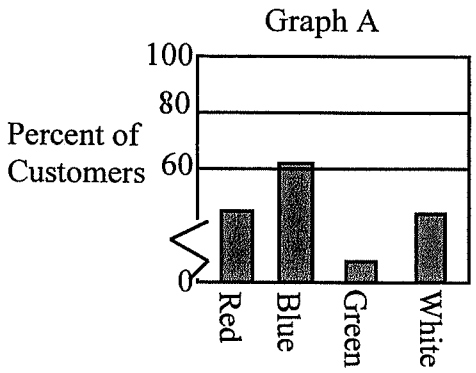
How much greater was the highest temperature than the lowest temperature?

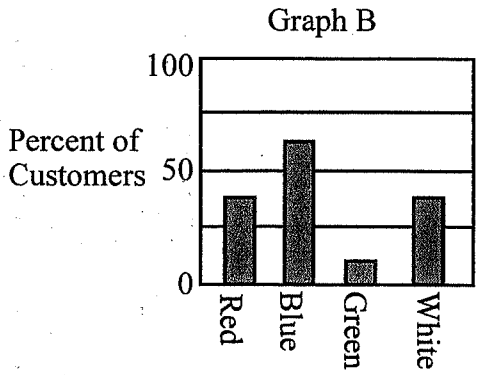
A. 13°  B. 31°  C. 38°  D. 5°

60. Make a stem-and-leaf plot for the following data.

36, 2, 10, 13, 25, 32, 35, 7, 10, 28, 9, 34, 8, 16

61. The bar graphs show the percent of customers who prefer different colors of T-shirts. Which statement describes the graph that could be considered misleading?




A. Graph A because of the change in the vertical scale.
B. Graph A because of the vertical scale includes 100.
C. Graph B because of the change in the vertical scale.
D. Graph B because it does not show the correct percents.

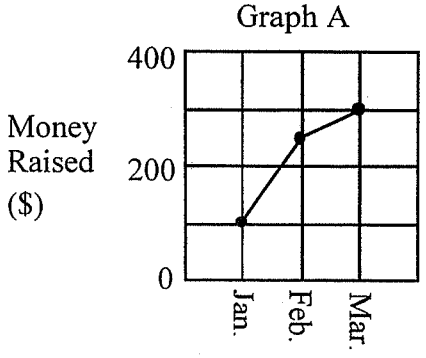
62. Rolinda's first five history test scores are 91, 91, 60, 65, and 68. What misleading statistic could Rolinda use to verify the claim that she is earning a good grade in history?

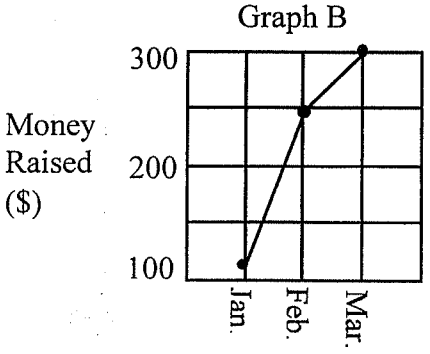
A. the median of 68
B. the range of 23
C. the mean of 75
D. the mode of 91

63. Raul is looking for a job. Five employees who hold the same job Raul is considering currently earn \$6.50, \$7.00, \$8.00, \$9.50, and \$9.50 an hour. Which statement is misleading?

A. The average hourly wage for this job is \$8.10.
B. Most employees with this job earn \$8.00 an hour or more.
C. The average hourly wage for this job is \$8.00.
D. The average hourly wage for this job is \$9.50.

64. The line graphs show the money raised by the Harris Middle School baseball team in January, February, and March. Which graph could be misleading? Explain.



65. Write as an integer: a loss of ten pounds

A. –10 B. 5 C. –5 D. 10

66. Find the opposite of 4

A. $-\frac{1}{4}$ B. 4 C. $\frac{1}{4}$ D. –4

67. Evaluate $|13|$

A. 13 B. $-\frac{1}{13}$ C. $\frac{1}{13}$ D. –13

68. Evaluate $|w|$ if $w = -11$.

A. 11 B. –11 C. $-\frac{1}{11}$ D. $\frac{1}{11}$

69. Compare

$9 \bigcirc -1$

A. = B. Not Given C. > D. <

70. Use =, < or > to make the following statement true.

–4 _____ –3

71. Which of the following statements is false?

A. $-9 < 3$ B. $9 > -3$ C. $3 > -9$ D. $-3 > 9$

72. Is the statement $|-2| < |8|$ true or false?

73. Write the integers 5, –3, 13, 11, 1, in order from least to greatest.

A. 5, –3, 13, 11, 1
B. –3, 1, 5, 13, 11
C. –3, 1, 5, 11, 13
D. 13, 11, 5, 1, –3

74. Arrange the following integers in order from least to greatest: 0, 3, –4, 6, –5, 5, –3

75. The chart below shows the average temperature on January 28 for five towns. Order the towns according to average temperature from warmest to coolest.

| Average Temperature (°F) January 28 | |
|---|---|
| Bender | 1 |
| Doeville | –8 |
| Hermiton | 5 |
| Rapids | –5 |
| Weaver | –12 |

A. Hermiton, Bender, Rapids, Doeville, Weaver
B. Rapids, Doeville, Hermiton, Bender, Weaver
C. Doeville, Hermiton, Weaver, Rapids, Bender
D. Weaver, Doeville, Rapids, Bender, Hermiton

**Add.**
76. 14 + (–10)

A. –24 B. 24 C. 4 D. –4

77. –17 + 10

**Subtract.**
78. –12 - (–10)

A. 22 B. 2 C. -2 D. –22

79. –10 - (–4)

80. –25 - (–10)

**Multiply.**
81. –3 • (–2)

A. –1 B. 6 C. –5 D. –6

82. –8 • (–9)

**Divide.**
83. –72 ÷ 9

A. 8 B. $\frac{1}{8}$ C. –8 D. $-\frac{1}{8}$

84. $-16 \div (-8)$
85. Evaluate $xy$ if $x = 15$ and $y = -1$.

86. Evaluate $x - y$ if $x = 3$ and $y = -12$.

87. Which is the correct algebraic expression for the following phrase?

the difference of $x$ and 6

A. $6x$ B. $6 - x$ C. $x - 6$ D. $\frac{x}{6}$

88. Which is the correct algebraic expression for the following phrase?

twice as many pencils

A. $p + 2$ B. $2p$ C. $\frac{p}{2}$ D. $2 + p$

89. Which is the correct algebraic expression for the following phrase?

seven increased by $y$

A. $7 + y$ B. $y - 7$ C. $7y$ D. $7 - y$

90. Which phrase can be written as the following algebraic expression?

$p - 10$

A. the difference of 10 and $p$
B. 10 less than $p$
C. $p$ less than 10
D. $p$ greater than 10

91. Which is the correct algebraic equation for the following sentence?

Six less than twice a number is 12.

A. $2n - 6 = 12$
B. $6 + 2n = 12$
C. $6 - 2n = 12$
D. $\frac{n}{2} - 6 = 12$

92. Which is the correct algebraic expression for the following sentence?

The number of pages increased by six is 14.

A. $6p = 14$
B. $p - 14 = 6$
C. $6 - p = 14$
D. $p + 6 = 14$

93. Which sentence is represented by the following algebraic equation?

$$3n + 4 = 2$$

A. Four less than three times a number is two.
B. Three more than a number plus four is two.
C. Three greater than a number plus four is two.
D. Four more than three times a number is two.

94. Geoff says he is thinking of a number. He says if he multiplies his number by 6 and subtracts 15, the result is 63. What is Geoff's number?

A. 78 B. 13 C. 363 D. 63

95. The Pizza Palace sold twice as many pizzas on Monday as on Tuesaday. On Wednesday, they sold 15 more pizzas than on Tuesday and 35 fewer than the 86 pizzas they sold on Thursday. How many pizzas did they sell on Monday?

A. 72 pizzas
B. 212 pizzas
C. 106 pizzas
D. 132 pizzas

96. Which of the following is equivalent to equation $3x - 6 = 3$?

A. $3x = 9$ B. $x = -1$ C. $x = 2$

97. Which of the following is equivalent to equation $\frac{x}{2} + 7 = -3$

A. $x = 5$ B. $x = -20$ C. $\frac{x}{2} = 4$

**Solve.**

98. $g + 2 = -5$

A. $-6$ B. $-7$ C. 2 D. $-14$

99. $x + 8.3 = 5.1$

100. $-24 = m - 9$

A. –33 B. 216 C. –20 D. –15

101. $-21 = m - 1$

102. $x - 2.1 = 7.6$

103. $7h = -98$

**Solve.**

104. $6.3 = 0.7y$

A. 0.9 B. 9 C. 8 D. 44.1

105. $-3x - 12 = 6$

A. 2 B. –6 C. 9 D. 3

106. $-2x + 2 = -10$

A. 6 B. 8 C. –4 D. 4

107. $-3x + 3 = 15$

**Complete each table.**

108. $y = 4x$

| $x$ | $y$ | $(x, y)$ |
|---|---|---|
| 2 | | |
| 1 | | |
| 0 | | |
| –1 | | |

109. $y = 2x - 1$

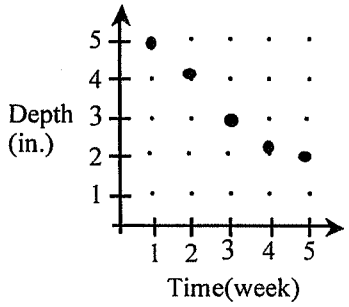
| $x$ | $y$ | $(x, y)$ |
|---|---|---|
| –1 | | |
| 0 | | |
| 1 | | |
| 2 | | |

110. The table below shows the water depth of a pond in winter over time.

| Water Level | |
|---|---|
| Time(week) | Depth |
| 1 | 1.88 |
| 2 | 2.12 |
| 3 | 3.00 |
| 4 | 4.25 |
| 5 | 5.00 |

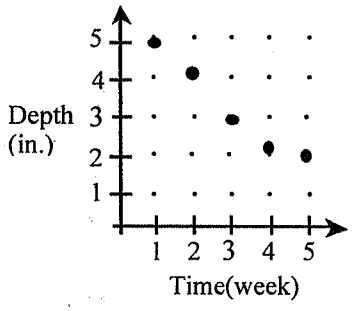
Graph the ordered pairs and make a statement about the trend that can be seen.

A.



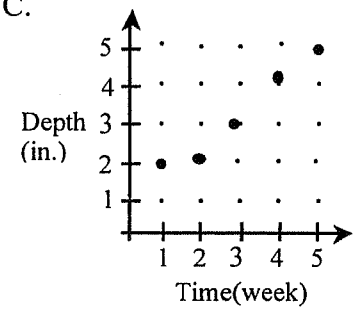

The depth of the water increases over time

B.



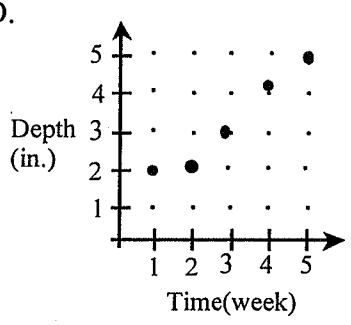

The depth of the water decreases over time

C.



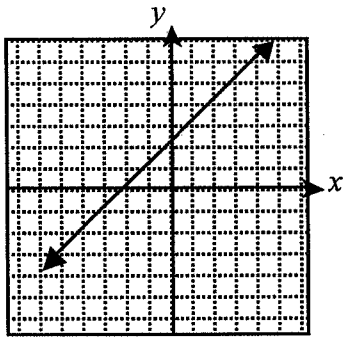

The depth of the water increases over time

D.




The depth of the water decreases over time

111. Which of the following tables matches the graph?




A.

| | | | | |
|---|---|---|---|---|
| $x$ | -4 | -2 | 1 | 4 |
| $y$ | -2 | 0 | 2 | 4 |

B.

| | | | | |
|---|---|---|---|---|
| $x$ | -2 | 0 | 2 | 4 |
| $y$ | -4 | -2 | 1 | 4 |

C.

| | | | | |
|---|---|---|---|---|
| $x$ | 0 | 3 | 6 | 9 |
| $y$ | -2 | 1 | 4 | 7 |

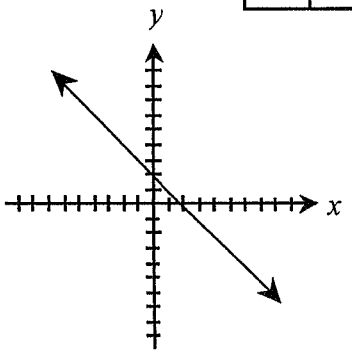
D.

| | | | | |
|---|---|---|---|---|
| $x$ | -2 | 1 | 4 | 7 |
| $y$ | 0 | 3 | 6 | 9 |

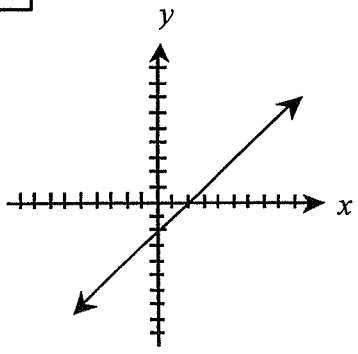
112. Which of the following graphs is the graph of the pairs of numbers in the table?

| | | | | |
|---|---|---|---|---|
| $x$ | 0 | 3 | 6 | 9 |
| $y$ | -2 | 1 | 4 | 7 |

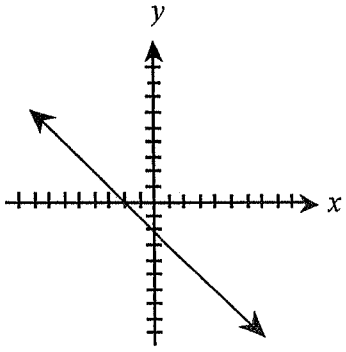
A.



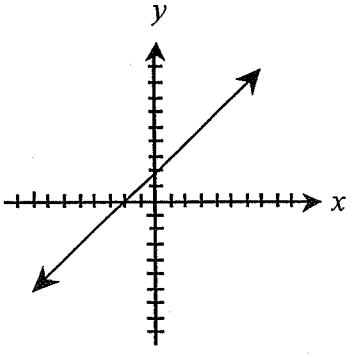

B.



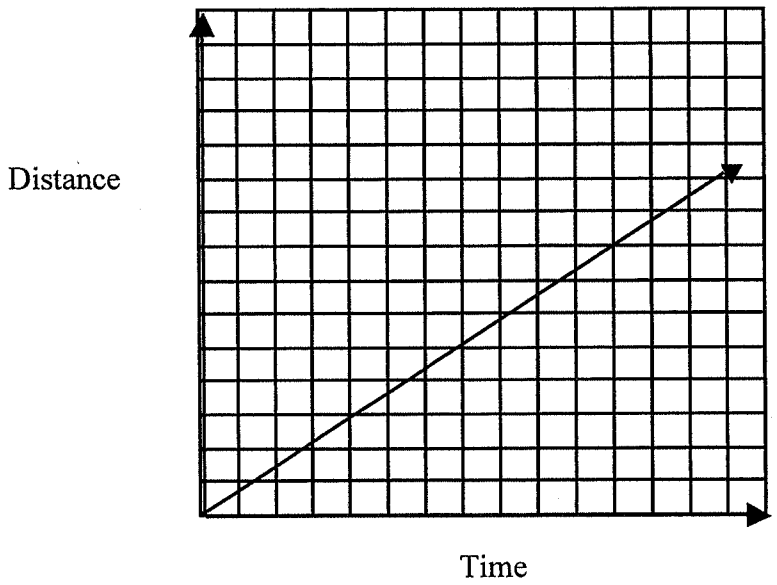

C.




D.



113. Describe a situation that might be represented by the function graphed below. Use a verbal description, a table, and an equation as part of your answer.




114. Simplify $3x + 7 + x - y$

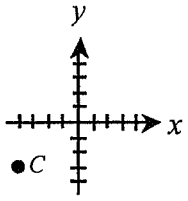
115. Simplify $4y + 3x + 2xy - y$

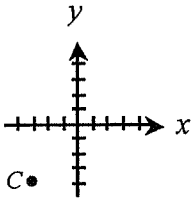
116. Solve and graph the solution set on a number line.
$3x \leq 12$

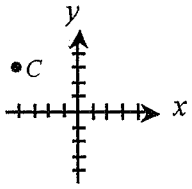
117. Solve and graph the solution set on a number line.
$2x + 5 > 8$

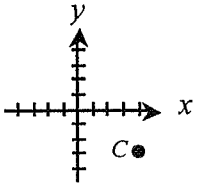
118. Graph the following on a number line.
$\frac{1}{4}, \frac{1}{2}, \frac{3}{4}$

119. Which of the following is the graph of the point $C(-4, -3)$?

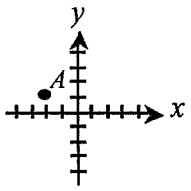
A.



B.



C.



D.


120. What are the coordinates of point $A$?

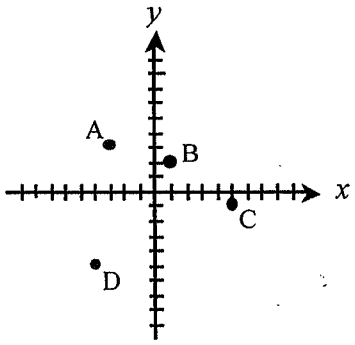



A. (-2, -1)  B. (-2, 1)  C. (2, 1)  D. (1, -2)

121. In which quadrant is the point with the coordinates (-1, -3)?

A. fourth quadrant
B. third quadrant
C. first quadrant
D. second quadrant

122. Name the coordinates of the points A, B, C, and D.




A. A(3, -3), B(1, 2), C(-1, 5), D(-4, -5)
B. A(3, -3), B(2, 1), C(-1, 5), D(-5, -4)
C. A(-3, 3), B(2, 1), C(5, -1), D(-5, -4)
D. A(-3, 3), B(1, 2), C(5, -1), D(-4, -5)

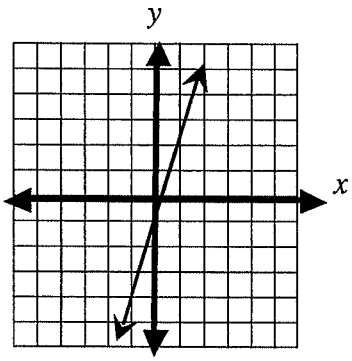
123. Complete the function table. Then graph the function.

$y = x - 3$

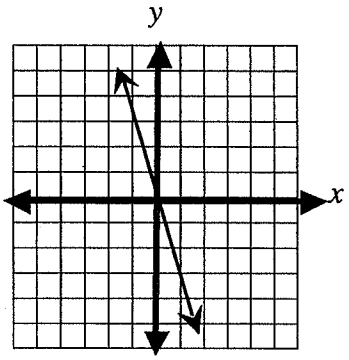
| $x$ | $x - 3$ | $y$ |
|---|---|---|
| -4 | | |
| 0 | | |
| 1 | | |

124. Which shows the graph of $y = -3x$?

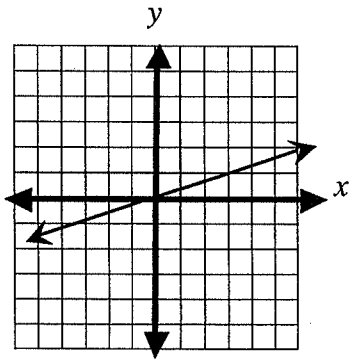
A.



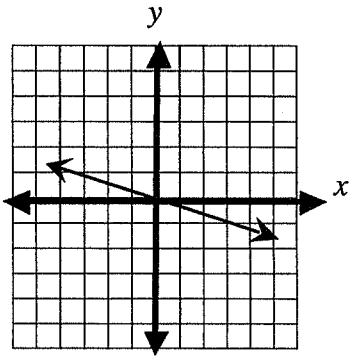

B.




C.




D.

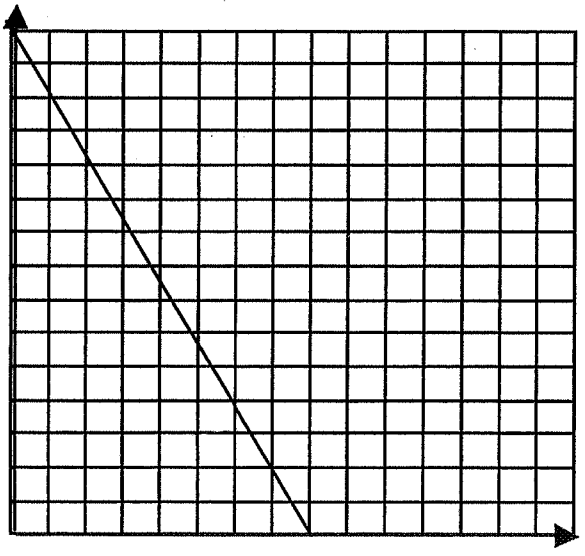



125. Graph: $y = -x - 4$

126. a) The cost of a school banquet is \$44 + 5n, where n is the number of people attending. Make a table of values.
b) Draw a graph of the equation.
c) What is the cost for 15, 35, and 75 people attending?

127. Describe a situation that might be represented by the function graphed below. Use a verbal description, a table, and an equation as part of your answer.

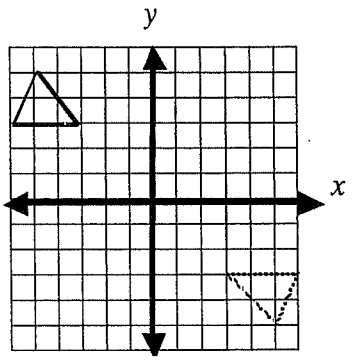
Distance



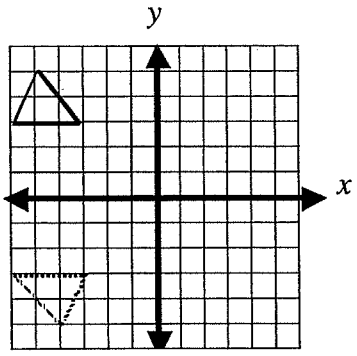
Time

128. Which graph shows the triangle with vertices (-6, 3), (-3, 3), and (-5, 5) and its image after a reflection across the x-axis?

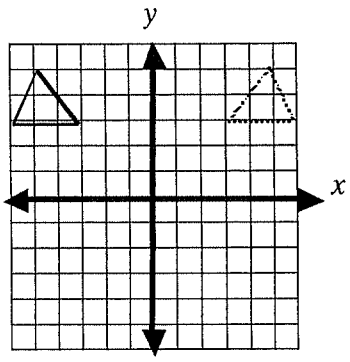
A



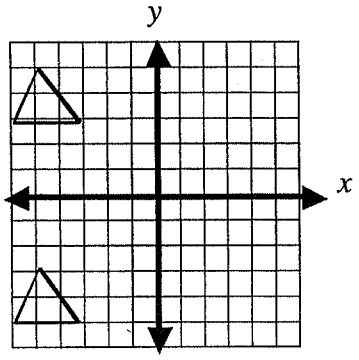

B.




C.

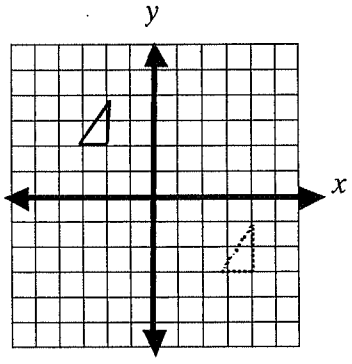



D.

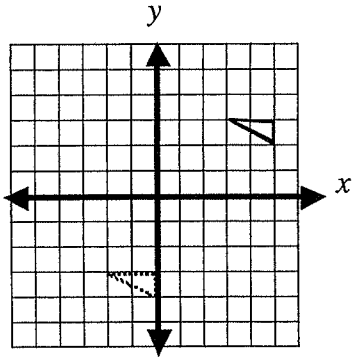



129. Which graph shows ΔPQR with P(-3, 2), Q(-2, 2), and R(-2, 4) and ΔPQR translated right 6 units and down 5 units?

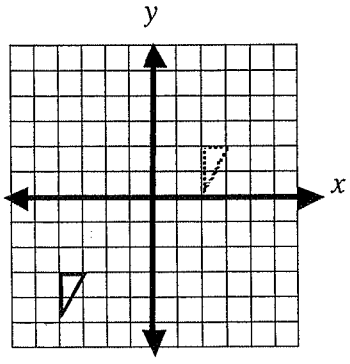
A.



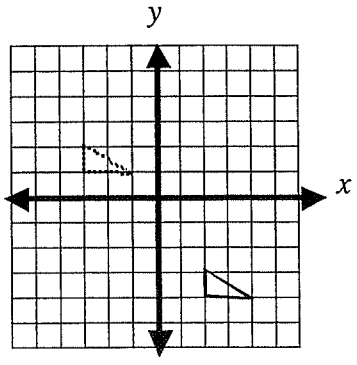

B.




C.

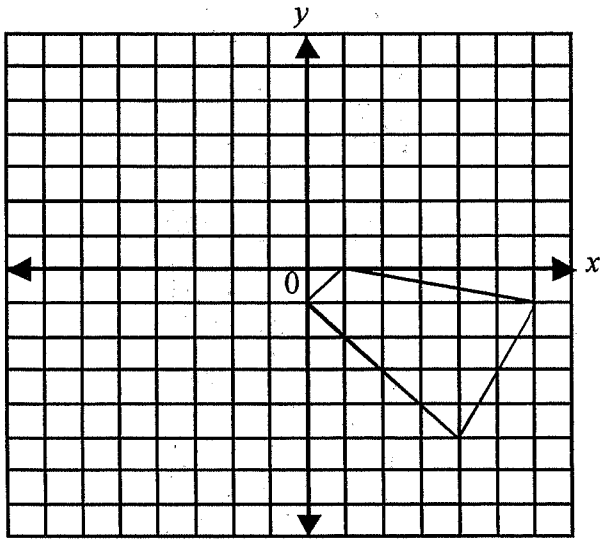



D.



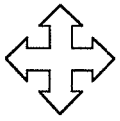
130. Graph triangle $PQR$ with $P(0, 7)$, $Q(3, 6)$, and $R(1, 1)$. Then graph the image of a translation 2 units to the left and 4 units down.

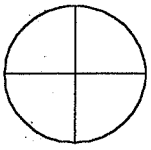
131. Ulrike and Rico are designing a flag for their school. Ulrike started the design as shown below.




Rico plans to use three different transformations to complete the design that Ulrike has started. Show how Rico can complete the design. Describe each transformation and give the coordinates of each of the figures.

132. Identify those figures below that have symmetry. For those that do, draw the lines of symmetry.

A. 

B. 

C. 

133. Find a fraction which simplifies to $\frac{1}{6}$.

134. Express $\frac{2}{5}$ as a percent.

A. 2% B. 10% C. 40% D. 400%

135. Express 44% as a fraction in simplest form.

A. $\frac{21}{50}$ B. $\frac{11}{25}$ C. $\frac{23}{50}$ D. $\frac{44}{100}$

136. Express 75% as a fraction in simplest form.

137. Write 0.7 as a fraction in simplest form.

A. $\frac{7}{1}$ B. $\frac{10}{7}$ C. $\frac{1}{7}$ D. $\frac{7}{10}$

138. Write 0.13 as a fraction in simplest form.

A. $\frac{13}{10}$ B. $\frac{13}{100}$ C. $\frac{1}{100}$ D. 13

139. Express 0.529 as a percent.

A. 5290% B. 5.29% C. 0.529% D. 52.9%

140. Write 0.02 as a percent.

141. Write $2\frac{3}{4}$% as a decimal.

A. 2.75 B. 0.0275 C. 0.275 D. 275

142. Write $5\frac{1}{4}$ as a percent.

A. 525% B. 21% C. 0.0525% D. 20.01%

143. Express the fraction as a percent. $\frac{4}{200}$

A. 8% B. 0.008% C. 2% D. 0.02%

144. What is the unit rate for driving 1,200 miles in 4 days?

A. 600 miles per day
B. 300 miles per day
C. 800 miles per day
D. 400 miles per day

145. Raul uses 4.8 pounds of ground beef to make a casserole that serves 15 people. How many pounds of ground beef will be used if he makes the casserole to serve 20 people?

A. 6.4 pounds B. 62.5 pounds C. 30.2 pounds D. 9.8 pounds

146. Mandy sold 50 of the 60 dolls she made. What percent of the dolls did she sell?

A. 12% B. 10% C. 50% D. $83\frac{1}{3}\%$

147. What is the unit rate for 360 miles in 6 hours?

A. 50 miles per hour
B. 90 miles per hour
C. 60 miles per hour
D. 40 miles per hour

148. What is 60% of 270?

A. 272 B. 162 C. 217 D. 107

149. What is 38% of 50?

A. $\frac{25}{19}$ B. 19% C. 19 D. 190

150. Which is the correct equation and solution for the following problem?

Find 18% of 45.

A. $P = 0.18 \bullet 45$; 8.1
B. $45 = 18 \bullet B$; 2.5
C. $P = 18 \bullet 45$; 810
D. $45 = 0.18 \bullet B$; 250

151. What is the percent of change of the membership of a club if the membership goes from 56 members to 70 members?

A. 80% B. 25% C. 20% D. 75%

152. Carin earned a grade of 78 on her first math exam and a 90 on her second math exam. What was the percent of increase in Carin's grade?

A. about 87% B. about 13% C. about 85% D. about 15%

153. What is the sales tax to the nearest cent on a $69 jacket if the rate is 7%?

A. $0.07 B. $48.30 C. $4.83 D. $7.00

154. What is the total cost to the nearest cent of a \$27.99 shirt if the sales tax rate is $8\frac{3}{4}$%?

A. \$2.45 B. \$30.44 C. \$46.00 D. \$48.48

155. Find the total cost to the nearest cent of a \$29.99 sweatshirt if the sales tax rate is 5%.

156. What is the amount of discount on a \$78 coat if the discount is 15%?

A. \$66.30 B. \$63 C. \$11.70 D. \$15.00

157. What is the percent of discount to the nearest percent if the regular price of a camera was \$89.90 and the sale price is \$78.50?

A. 87% B. 85% C. 15% D. 13%

158. What is the simple interest for a principal of \$450 invested at a rate of 8% for 2 years?

A. \$360 B. \$18 C. \$16 D. \$72

159. What is the simple interest to the nearest cent on a credit card balance of \$1,500 at an 18% interest rate for 6 months?

A. \$540 B. \$135 C. \$108 D. \$270

160. Thaddeus deposited \$650 in an account that earned 8.5% simple interest. How much interest had the money earned by the end of three years?

161. Find the circumference of a circle whose radius is 3 in. Use 3.14 for $\pi$.

162. Find the circumference of a circle whose diameter is 7 cm. Use $\pi = 3.14$.

A. 10.14 cm B. 21.98 cm C. 10.99 cm D. 43.96 cm

163. Find the area of a circle whose radius is 45 cm. Use 3.14 for $\pi$.

A. 12717 $cm^2$ B. 3179.25 $cm^2$ C. 282.6 $cm^2$ D. 6358.5 $cm^2$

164. Find the area of the circle whose radius is 3 cm. Use 3.14 for $\pi$.

165. The table shows the US population by age in 1990.

US Population, 1990

| Age (years) | Number (millions) |
|---|---|
| Under 5 | 18.4 |
| 5 – 20 | 57.0 |
| 21 – 44 | 95.8 |
| 45 – 64 | 46.4 |
| 65 and over | 31.2 |

Make a circle graph of the US population in 1990.

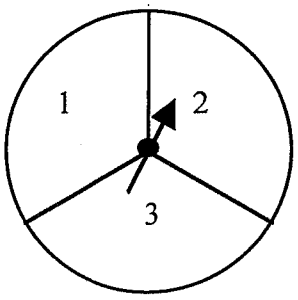
166. There are 5 red marbles, 4 white marbles, 3 blue marbles, and 8 green marbles in a bag. Suppose you select one marble at random. What is $P$(white)?

A. $\frac{1}{5}$ B. $\frac{1}{16}$ C. $\frac{1}{4}$ D. $\frac{1}{8}$

167. Reba and Adam tossed their coins 30 times and got heads 16 times. What is the experimental probability of tossing a head using Reba and Adam's results?

A. $\frac{1}{2}$ B. $\frac{7}{8}$ C. $\frac{1}{4}$ D. $\frac{8}{15}$

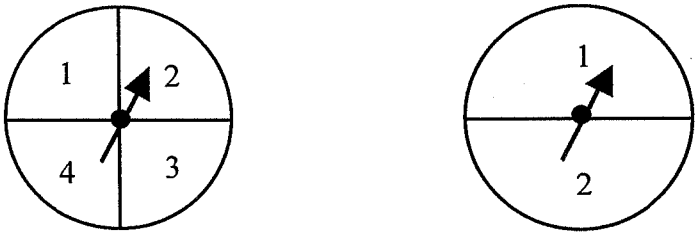
168. Jamila spins a spinner like the one below 25 times. It lands on 3 five times. What is the experimental probability of spinning a 3? What is the theoretical probability of spinning a 3?




169. A bag contains 6 yellow, 8 blue, and 2 red marbles. Two marbles are drawn, but the first marble is not replaced. What is $P$(both yellow)?

A. $\frac{9}{64}$ B. $\frac{17}{24}$ C. $\frac{1}{8}$ D. $\frac{3}{4}$

170. Suppose you spin the two spinners shown below. Make a tree diagram and list the outcomes. What is the total number of outcomes?




171. What are the total number of outcomes when 2 coins and a number cube are tossed?

A. 6 B. 12 C. 8 D. 24

172. A coin is tossed and a number cube is rolled. What is the probability of getting tails and a number less than 3?

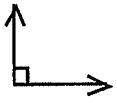
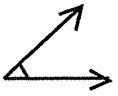
A. $\frac{11}{30}$ B. $\frac{1}{5}$ C. $\frac{2}{5}$ D. $\frac{1}{6}$

173. At a banquet you have a choice of three different salads, four different entrees, and three different desserts. How many choices do you have?

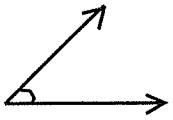
A. 10 B. 36 C. 13 D. 15

174. Use the Counting Principle to find the total number of outcomes when 2 coins and 2 number cubes are tossed.

175. Which of the following is a right angle?

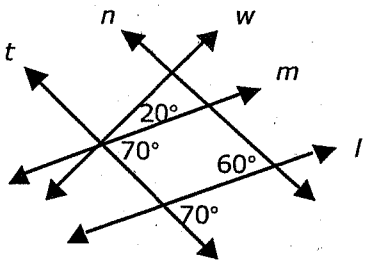
A. 
B. 
C. 
D. 

176. Classify the angle below.

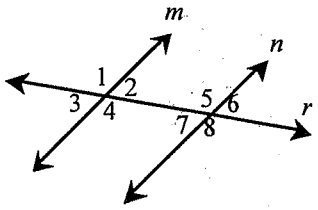


A. right B. acute C. straight D. obtuse

177. In the figure, name (a) two parallel lines and (b) two perpendicular lines




**In the figure below, $m \| n$ and $r$ is a transversal. If $m\angle 2 = 45°$, find the measure of each angle.**




178. $\angle 4$

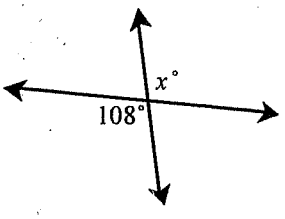
179. $\angle 5$

180. $\angle 7$

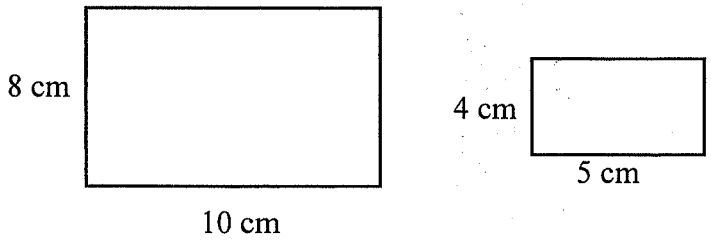
181. $\angle 8$

182. $\angle 6$

183. Find the value of $x$ in the figure.




184. Which statement is true about the following pair of polygons?



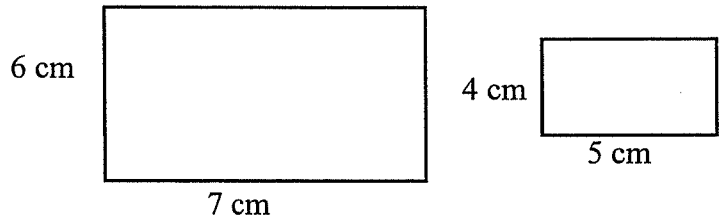

A. They are similar because $\frac{4}{8} = \frac{5}{10}$

B. They are not similar because $\frac{4}{10} = \frac{5}{8}$

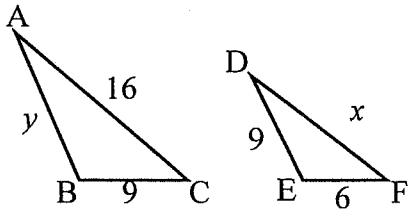
C. They are similar because $\frac{4}{10} = \frac{2}{5}$

D. They are not similar because $\frac{10}{4} = \frac{5}{2}$

185. Tell whether the following pair of polygons is similar. Justify your answer.

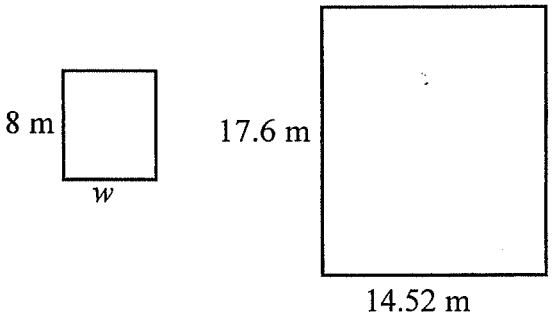



186. Given $\Delta ABC \sim \Delta DEF$, solve for $x$ and $y$.



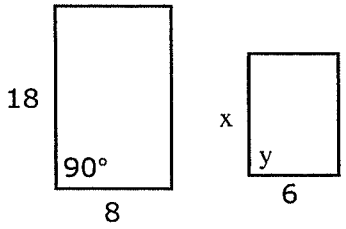

A. $x = 10.7, y = 14.5$
B. $x = 11.7, y = 14.5$
C. $x = 11.7, y = 13.5$
D. $x = 10.7, y = 13.5$

187. The two rectangles are similar. Find the width of the smaller rectangle.

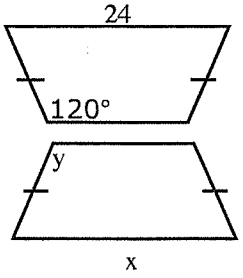



**Tell whether each pair of polygons is congruent or similar. In each, find x and y.**

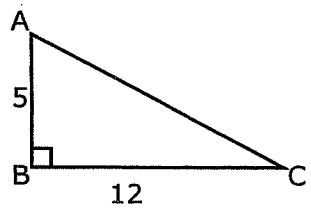
188.




189.



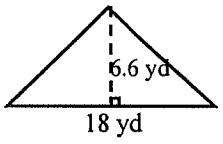
190. In the right triangle, identify the hypotenuse and find its length.




191. Find the sum of the measures of the interior angles of a pentagon.

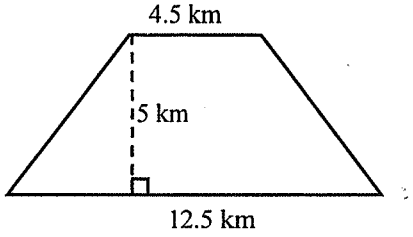
192. Find the measure of an interior angle of a regular hexagon.

193. Find the area:



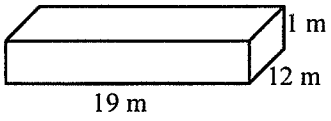

A. 62 $yd^2$ B. 118.8 $yd^2$ C. 59.4 $yd^2$ D. 24.6 $yd^2$

194. Find the area:




195. A rectangular prism is 7 cm long, 7 cm wide, and 3 cm high. Find the surface area of the prism.

196. Find the volume of the rectangular prism.




A. 32 $m^3$ B. 518 $m^3$ C. 228 $m^3$ D. 114 $m^3$

**On a map, the scale is 1 inch:150 miles. For each map distance, find the actual distance.**

197. 3 inches

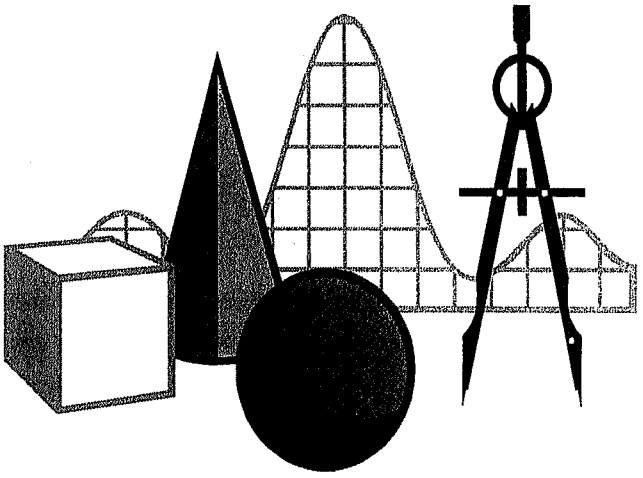
198. 8 inches

**On a scale drawing, the scale is $\frac{1}{4}$ inch:1 foot. Find the dimensions of each room in the scale drawing.**

199. 15 feet by 25 feet

200. 20 feet by 12 feet

# ANSWERS



## ANSWER KEY

1. B
2. 52
3. A
4. 256
5. A
6. A
7. B
8. 13
9. D
10. $9.3 \times 10^2$
11. $6.2 \times 10^4$
12. C
13. A
14. $\frac{19}{24}$
15. D
16. D
17. A
18. $\frac{1}{55}$
19. $5\frac{5}{6}$
20. D
21. $\frac{7}{36}$
22. A
23. $\frac{171}{344}$
24. D
25. B
26. 40
27. A
28. A
29. C
30. A
31. D
32. C
33. B
34. A
35. No; \$20 + 2(\$16) + \$50 = \$102 and \$120 - \$102 = \$18 < \$38
36. 430
37. A
38. 32
39. false
40. 81
41. B
42. B
43. 135
44. B
45. neither
46. B
47. C
48. C
49. C
50. C
51. D
52. white
53. mean = 16.2, median = 17, mode = 14. He should use the median because it is the highest
54. range = 30; scale: 5-35, interval: 5
55. C
56. D
57. A
58. about 500 t-shirts
59. C
60. 1 | 0 = 10

| Stem | Leaf |
|---|---|
| 0 | 2 7 8 9 |
| 1 | 0 0 3 6 |
| 2 | 5 8 |
| 3 | 2 4 5 6 |

61. A
62. D
63. D
64. Graph B could be misleading because of the change in the vertical scale.
65. A
66. D
67. A
68. A
69. C
70. -4 < -3
71. D
72. true
73. C
74. –5, -4, -3, 0, 3, 5, 6
75. A

## ANSWER KEY

76. C
77. –7
78. C
79. –6
80. –15
81. B
82. 72
83. C
84. 2
85. –15
86. 15
87. C
88. B
89. A
90. B
91. A
92. D
93. D
94. B
95. A
96. A
97. B
98. B
99. –3.2
100. D
101. –20
102. 9.7
103. –14
104. B
105. B
106. A
107. –4

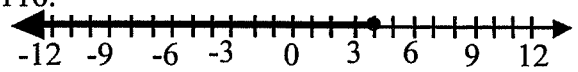
108. (Answer is just a suggestion).

| $x$ | $y$ | $(x, y)$ |
|---|---|---|
| 2 | 8 | (2, 8) |
| 1 | 4 | (1, 4) |
| 0 | 0 | (0, 0) |
| -1 | -4 | (-1, -4) |

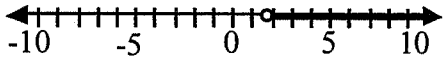
109. (Answer is just a suggestion)

| $x$ | $y$ | $(x, y)$ |
|---|---|---|
| -1 | -3 | (-1, -3) |
| 0 | -1 | (0, -1) |
| 1 | 1 | (1, 1) |
| 2 | 3 | (2, 3) |

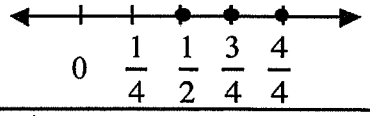
110. C
111. D
112. B
113. *See Appendix*
114. $4x - y + 7$
115. $3y + 3x + 2xy$
116.




117.



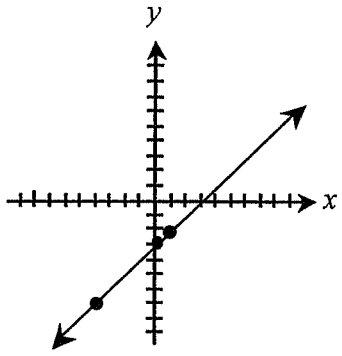

118.




119. A
120. B
121. B
122. D
123.

$y = x - 3$

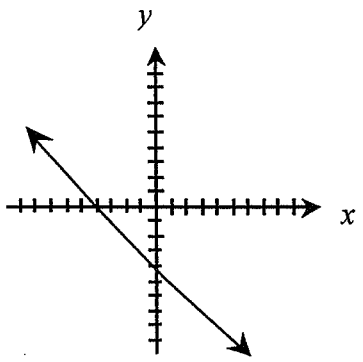
| $x$ | $x - 3$ | $y$ |
|---|---|---|
| -4 | -4 – 3 | -7 |
| 0 | 0 – 3 | -3 |
| 1 | 1 – 3 | -2 |




124. B

# ANSWER KEY

125.

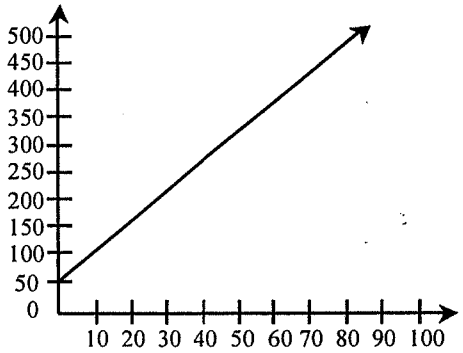



126.

a)

| $n$ | $\$44 + 5n$ |
|---|---|
| 10 | 94 |
| 30 | 194 |
| 50 | 294 |
| 100 | 544 |

b)



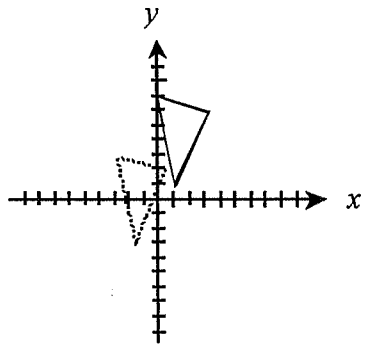

c) \$119, \$219, \$419

127. *See Appendix*

128. B

129. A

130.




131. *See Appendix*

132. *See Appendix*

133. Answers will vary. Sample: $\frac{5}{30}$

134. C

135. B

136. $\frac{3}{4}$

137. D

138. B

139. D

140. 2%

141. B

142. C

143. C

144. B

145. A

146. D

147. C

148. B

149. C

150. A

151. B

152. D

153. C

154. B

155. \$31.49

156. C

157. D

158. D

159. B

160. \$165.75

161. 18.84 in

162. B

163. D

164. 28.26 $cm^2$

165. *See Appendix*

166. A

167. D

168. $\frac{1}{5}, \frac{1}{3}$

169. C

170. 8 outcomes; see student's diagram;
1, 1; 1, 2; 2, 1; 2, 2; 3, 1; 3, 2; 4, 1; 4, 2

171. D

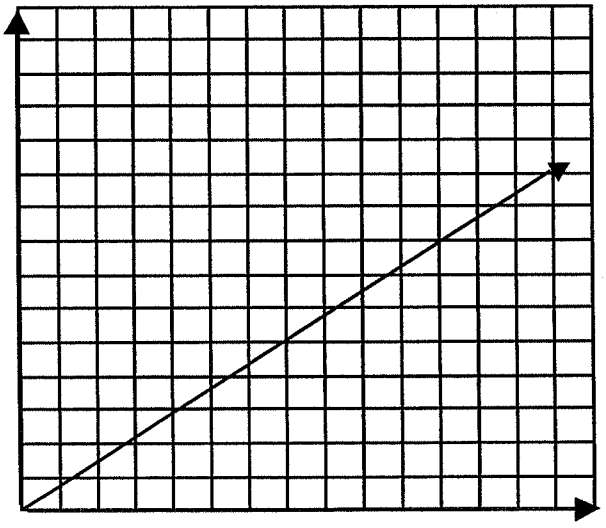
## ANSWER KEY

| |
|---|
| 172. D |
| 173. B |
| 174. 144 |
| 175. B |
| 176. B |
| 177. $l \parallel m,\ w \perp t$ |
| 178. 135° |
| 179. 135° |
| 180. 45° |
| 181. 135° |
| 182. 45° |
| 183. 108° |
| 184. A |
| 185. No; $\frac{4}{6} \neq \frac{5}{7}$ |
| 186. D |
| 187. 6.6 m |
| 188. similar, x = 13.5, y = 90° |
| 189. congruent, x = 24, y = 120° |
| 190. hypotenuse AC, 13 |
| 191. 540° |
| 192. 120° |
| 193. C |
| 194. 42.5 $km^2$ |
| 195. 182 $cm^2$ |
| 196. C |
| 197. 450 miles |
| 198. 1,200 miles |
| 199. $3\frac{3}{4}$ in by $6\frac{1}{4}$ |
| 200. 5 in by 3 in |

Appendix

113. Answers will vary. Sample: A man is driving 75 miles per hour. How many miles does he travel?

Distance in hundreds of miles



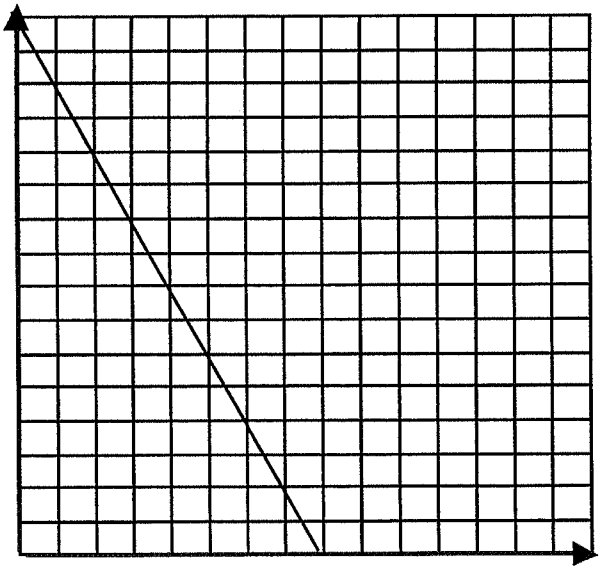
Time in hours

$y = 75x$

| x | 75x | y |
|---|---|---|
| 4 | 75•4 | 300 |
| 8 | 75•8 | 600 |
| 12 | 75•12 | 900 |

127. Answers will vary. Sample: Kim is riding home on her bicycle. She is 16 miles from home and she rides at a rate of 2 miles per hour. When will she arrive home?

Distance in miles

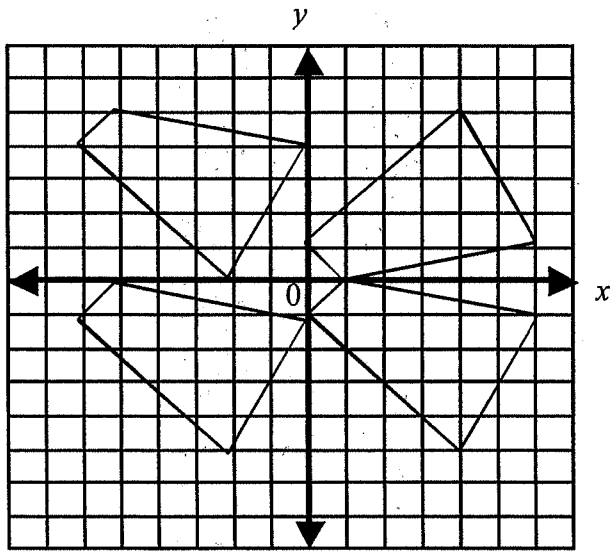


Time in hours

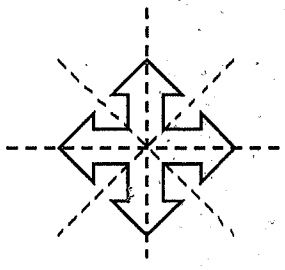
$y = -2x + 16$

| x | -2x+16 | y |
|---|---|---|
| 0 | -2•0+16 | 16 |
| 1 | -2•1+16 | 14 |
| 2 | -2•2+16 | 12 |

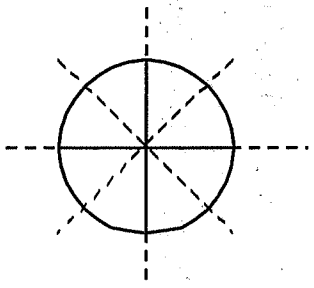
131. Answers will vary. Sample: First translate the shape 6 units left. Next, translate the image 5 units up. Then reflect the original shape over the x-axis.




132. A. Symmetry

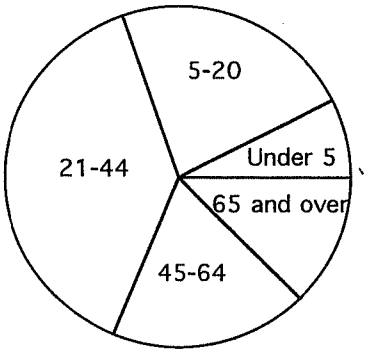


B. Symmetry



C. No symmetry

165. US Population, 1990




| | |
|---|---|
| Under 5 | 27° |
| Ages 5-20 | 82° |
| Ages 21-44 | 139° |
| Ages 45-64 | 67° |
| 65 and over | 45° |