Base your answers to questions 1 and 2 on the following circle graph which shows the portion of the time Billy spends at home, work, school, and in his car.

1. About how many hours in a day does he work?
   (A) 3  (C) 8
   (B) 5  (D) 20

2. About how many hours in a day does he spend at home?
   (A) 8  (C) 13
   (B) 11  (D) 16

3. Mary and John are eating pizza. Mary ate 25% and John ate 3/8 of the pizza. What percent of the pizza is left?
   (A) 30%  (C) 25%
   (B) 40%  (D) 37.5%

4. Solve for \( x \): \[ 9x = 729 \]
   (A) 2  (C) 4
   (B) 3  (D) 5

5. Melanie bought a house that cost $125,000. The down payment was $39,587. Estimate how much she owed for the house after paying the down payment.
   (A) $45,000  (C) $85,000
   (B) $65,000  (D) $90,000

6. A drum-set from the music store cost $178.99 after a 10% discount. Which is closest to the original price?
   (A) $160  (C) $190
   (B) $180  (D) $200

7. A rental car service had 139 cars to rent. 79 of the cars were rented out. Approximately what percent of the cars were rented?
   (A) 42.1%  (C) 56.8%
   (B) 53.5%  (D) 79.5%

8. It takes 45 minutes to record 3 cassette tapes. How long does it take to record 7 cassette tapes?
   (A) 90 minutes  (C) 135 minutes
   (B) 105 minutes  (D) 315 minutes

9. What percent is represented by the picture?
   (A) 0.44%  (C) 44%
   (B) 0.54%  (D) 54%

10. For an experiment, Andrea is determining the growth of a flower. She measures the plant once each week. The picture below shows the height of the plant at two times. How much did the plant grow between Time 1 and Time 2?

   (A) 1.4 cm  (C) 10.1 cm
   (B) 1.5 cm  (D) 11.5 cm

11. If a factory makes 360 buckets in an hour, how many buckets do they make in 1 minute?
   (A) 6 buckets  (C) 18 buckets
   (B) 10 buckets  (D) 36 buckets

12. An average car weighs approximately
   (A) 20 pounds  (C) 2,000 pounds
   (B) 200 pounds  (D) 20,000 pounds

13. Using the ruler in the picture, approximately what is the length of this pencil?

   (A) 0.250 inches  (C) 4.375 inches
   (B) 4.000 inches  (D) 4.625 inches

14. The temperature in Miami was 75°F, while the temperature in Alaska was –18°F. How much colder was it in Alaska?
   (A) 57°F  (C) 90°F
   (B) 93°F  (D) 18°F
15. What is the angle measure of \( \triangle CDE 
\)
(A) 50°  
(B) 100°  
(C) 150°  
(D) 200°

16. What is the approximate area of the circle?

(A) 16 cm\(^2\)  
(B) 50 cm\(^2\)  
(C) 64 cm\(^2\)  
(D) 201 cm\(^2\)

17. Brian drove 12 miles due west and 16 miles due north. How far from his original position is he?

(A) 20 miles  
(B) 28 miles  
(C) 4 miles  
(D) 32 miles

18. Which geometric figure has a shape most like a baseball?

(A) cone  
(B) cylinder  
(C) pyramid  
(D) sphere

19. Find the volume of the rectangular prism below.

(A) 26 in\(^3\)  
(B) 225 in\(^3\)  
(C) 450 in\(^3\)  
(D) 900 in\(^3\)

20. Which of the following numbers could be represented by the point in the figure below?

(A) \( \frac{1}{2} \)  
(B) \( \sqrt{2} \)  
(C) 1.7  
(D) \( \frac{3}{2} \)

21. Which quadrants does the line \( y = 3x \) run through?

(A) I and II  
(B) II and III  
(C) I and III  
(D) II and IV

22. Donna has 14 candy bars and wants to split them evenly among her friends, saving 2 for herself. She gives 3 to each of her friends. Which one of the following expressions could you use to find out how many friends Donna gave candy to?

(A) \( 2 = 14 + 3f \)  
(B) \( 14 = 2 + 3f \)  
(C) \( 14 = 3f - 2 \)  
(D) \( 14 + 3f + 2 = 0 \)

23. Bill went into a pet store and made some observations about the 90 fish in the store. He observed that there were twice as many brown fish as blue fish, and 3 times as many blue fish as red fish. If he wishes to know how many red fish he observed, which of the following expressions will he need?

(A) \( 6x - 3x = 90 - x \)  
(B) \( 6x + 3x = 90 + x \)  
(C) \( 6x + 3x = x - 90 \)  
(D) \( 6x + 3x = 90 - x \)

24. When \( x = 2 \), the equation \( x^3 + 4x - 5 \) equals

(A) -5  
(B) 7  
(C) 9  
(D) 11

25. Madison is buying gumballs at the candy store. The first gumball costs her \$0.30. Each additional gumball after that costs her \$0.24. She spent \$2.94. How many gumballs did she buy?

(A) 10 gumballs  
(B) 11 gumballs  
(C) 12 gumballs  
(D) 13 gumballs

26. Simplify: \( 3x(2x^2 - y^3) \)

(A) \( 5x^2 - 3x^3y^3 \)  
(B) \( 5x^2 + 3x^3y^3 \)  
(C) \( 6x^3 - 3xy^3 \)  
(D) \( 6x^3 + 3xy^3 \)

27. In the expression \( 10x + 2 \), what is the variable?

(A) 10  
(B) \( x \)  
(C) 2  
(D) 10x

28. By the distributive property, \( 35 - 7 = \)

(A) \( 7 - 35 \)  
(B) \( 35 + 7 \)  
(C) \( -7 + 35 \)  
(D) \( 7(5 - 1) \)
29. The chart below shows the average speeds of drivers A, B, C, and D and the time each driver drove for.

<table>
<thead>
<tr>
<th>Driver</th>
<th>Speed</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>25 ft/s</td>
<td>24 sec</td>
</tr>
<tr>
<td>B</td>
<td>33 ft/s</td>
<td>48 sec</td>
</tr>
<tr>
<td>C</td>
<td>35 ft/s</td>
<td>10 sec</td>
</tr>
<tr>
<td>D</td>
<td>25 ft/s</td>
<td>8 sec</td>
</tr>
</tbody>
</table>

Which car traveled the furthest?
(A) A        (C) C
(B) B        (D) D

30. You go to a coffee shop where you are presented with many options. You can have Regular, Decaffeinated, or French Vanilla coffee. You can have it with or without sugar. Also, you can have it with whole milk, half and half, one percent milk, or no milk. How many different ways are possible to have your coffee?
(A) 9        (C) 20
(B) 18       (D) 24

31. Marcus has a bag of marbles. The bag contains 10 blue marbles, 5 green marbles, 16 red marbles, and 9 orange marbles. He picks a marble from the bag at random. What is the probability that he picked a red marble?
(A) 40%      (C) 12.5%
(B) 25%      (D) 22.5%

32. The table below shows the number of miles Gary walked in a week

<table>
<thead>
<tr>
<th>Day</th>
<th># of Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>11</td>
</tr>
<tr>
<td>Tuesday</td>
<td>9</td>
</tr>
<tr>
<td>Wednesday</td>
<td>4</td>
</tr>
<tr>
<td>Thursday</td>
<td>15</td>
</tr>
<tr>
<td>Friday</td>
<td>0</td>
</tr>
</tbody>
</table>

What is the mean distance Gary walked?
(A) 7.8     (C) 8
(B) 7.6     (D) 7.4

33. Carl has saved $12.00 in his savings account and plans to save $3.00 each week. Ian has $9.00 and plans to save $4.00 each week. Both save as planned. After how many weeks will they have the same amount of money in their accounts?
(A) after 2 weeks        (D) after 5 weeks
(B) after 3 weeks        (E) after 6 weeks
(C) after 4 weeks

34. Which equation would produce the pattern in the table below?

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>4</td>
<td>31</td>
</tr>
<tr>
<td>5</td>
<td>37</td>
</tr>
</tbody>
</table>

(A) $y = 6x + 7$   (C) $y = 8x + 1$
(B) $y = 7x + 4$   (D) $y = 9x - 2$

35. The students at Boone Middle School are planting trees in a pattern in their courtyard. The first row will have 3 trees, the second row will have 7 trees, and the third row will have 11 trees. If the pattern continues, how many trees will be in the sixth row?
(A) 15 trees       (C) 19 trees
(B) 23 trees       (D) 27 trees

36. Mark had 16 baseball cards in his collection. He traded half of them to his friend and received 2 cards back for every 1 he traded. How many cards does Mark have now?
(A) 8           (C) 24
(B) 16          (D) 32

Base your answers to questions 37 through 39 on the grades on a test, which were 99, 96, 94, 89, 85, 82, 82, 81, 75, 73, 69, 54, 33, 21, and 2.

37. What is the average (mean) of the grades?
(A) 2           (C) 81
(B) 69          (D) 82

38. What is the median of the grades?
(A) 2           (C) 75
(B) 69          (D) 81

39. What is the mode of the grades?
(A) 2           (C) 81
(B) 69          (D) 82

40. In Mrs. Jones' class, a student's final grade depends on the student's average (mean) score for three exams and a project (all four items weighted equally). If that average is 90 or higher, the student earns an A. Michelle's average score for the three tests is 94. What is the lowest score she can get on the project and still receive an A in the class?
(A) 68          (C) 88
(B) 78          (D) 90

41. Jamal owned 50 marbles. Every hour he lost 9 marbles. In how many hours did Jamal have less than 10 marbles?
(A) 4           (C) 6
(B) 5           (D) 7
Answer Key

1. B
2. B
3. D
4. B
5. C
6. D
7. C
8. B
9. C
10. A
11. A
12. C
13. C
14. B
15. B
16. B
17. A
18. D
19. C
20. B
21. C
22. B
23. D
24. D
25. C
26. C
27. B
28. D
29. B
30. D
31. A
32. A
33. B
34. A
35. B
36. C
37. B
38. D
39. D
40. B
41. B
40. VI. DATA ANALYSIS AND PROBABILITY / C. Statistical Methods / 1. Statistical Measures and Data Comparison / a. Central tendency: mean, median, mode : 0000576
41. VII. PATTERNS AND FUNCTIONS / A. Patterns: Identification, Representation / 1. Numerical and Geometric Patterns / a. Numeric : 0000124
1. Grades 6-8: E. Data Analysis and Probability / 1: The student understands and uses the tools of data analysis for managing information. / MA.E.1.3.1 Collects organizes and displays data in a variety of forms including tables line graphs charts bar graphs to determine how different ways of presenting data can lead to different interpretations.

Grades 6-8: E. Data Analysis and Probability / 3: The student uses statistical methods to make inferences and valid arguments about real-world situations. / MA.E.3.3.1 Formulates hypotheses designs experiments collects and interprets data and evaluates hypotheses by making inferences and drawing conclusions based on statistics (range mean median and mode) and tables graphs and charts. / : 0000547

2. Grades 6-8: E. Data Analysis and Probability / 1: The student understands and uses the tools of data analysis for managing information. / MA.E.1.3.1 Collects organizes and displays data in a variety of forms including tables line graphs charts bar graphs to determine how different ways of presenting data can lead to different interpretations.

Grades 6-8: E. Data Analysis and Probability / 3: The student uses statistical methods to make inferences and valid arguments about real-world situations. / MA.E.3.3.1 Formulates hypotheses designs experiments collects and interprets data and evaluates hypotheses by making inferences and drawing conclusions based on statistics (range mean median and mode) and tables graphs and charts. / : 0000548

3. Grades 6-8: A. Number Sense Concepts and Operations / 1: The student understands the different ways numbers are represented and used in the real world. / MA.A.1.3.1 Associates verbal names written word names and standard numerals with integers fractions decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios.

Grades 6-8: A. Number Sense Concepts and Operations / 1: The student understands the different ways numbers are represented and used in the real world. / MA.A.1.3.2 Understands the relative size of integers fractions and decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios.

Grades 6-8: A. Number Sense Concepts and Operations / 1: The student understands the different ways numbers are represented and used in the real world. / MA.A.1.3.3 Understands concrete and symbolic representations of rational numbers and irrational numbers in real-world situations.

Grades 6-8: A. Number Sense Concepts and Operations / 1: The student understands the different ways numbers are represented and used in the real world. / MA.A.1.3.4 Understands that numbers can be represented in a variety of equivalent forms including integers fractions decimals percents scientific notation exponents radicals and absolute value.

Grades 6-8: A. Number Sense Concepts and Operations / 2: The student understands number systems. / MA.A.2.3.1 Understands and uses exponential and scientific notation. / : 0002797

4. Grades 6-8: A. Number Sense Concepts and Operations / 1: The student understands the different ways numbers are represented and used in the real world. / MA.A.1.3.1 Associates verbal names written word names and standard numerals with integers fractions decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios.

Grades 6-8: A. Number Sense Concepts and Operations / 1: The student understands the different ways numbers are represented and used in the real world. / MA.A.1.3.2 Understands the relative size of integers fractions and decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios.

Grades 6-8: A. Number Sense Concepts and Operations / 1: The student understands the different ways numbers are represented and used in the real world. / MA.A.1.3.4 Understands that numbers can be represented in a variety of equivalent forms including integers fractions decimals percents scientific notation exponents radicals and absolute value.

Grades 6-8: A. Number Sense Concepts and Operations / 2: The student understands number systems. / MA.A.2.3.1 Understands and uses exponential and scientific notation. / : 000369

5. (none) 0001431

6. (none) 0002420

7. Grades 6-8: A. Number Sense Concepts and Operations / 1: The student understands the different ways numbers are represented and used in the real world. / MA.A.1.3.1 Associates verbal names written word names and standard numerals with integers fractions decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios.

Grades 6-8: A. Number Sense Concepts and Operations / 1: The student understands the different ways numbers are represented and used in the real world. / MA.A.1.3.2 Understands the relative size of integers fractions and decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios. / : 0000101

8. Grades 6-8: A. Number Sense Concepts and Operations / 1: The student understands the different ways numbers are represented and used in the real world. / MA.A.1.3.1 Associates verbal names written word names and standard numerals with integers fractions decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios.

Grades 6-8: A. Number Sense Concepts and Operations / 1: The student understands the different ways numbers are represented and used in the real world. / MA.A.1.3.2 Understands the relative size of integers fractions and decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios. / : 0000163

9. Grades 6-8: A. Number Sense Concepts and Operations / 1: The student understands the different ways numbers are represented and used in the real world. / MA.A.1.3.1 Associates verbal names written word names and standard numerals with integers fractions decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios.
State Genealogy by Question

Grades 6-8: A. Number Sense Concepts and Operations / 1: The student understands the different ways numbers are represented and used in the real world. / MA.A.1.3.2 Understands the relative size of integers fractions and decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios. / : 0001878

10. Grades 6-8: B. Measurement / 3: The student estimates measurements in real-world problem situations. / MA.B.3.3.1 Solves real-world and mathematical problems involving estimates of measurements including length time weight/mass temperature money perimeter area and volume in either customary or metric units. : 000590

11. Grades 6-8: B. Measurement / 2: The student compares contrasts and converts within systems of measurement (both standard/nonstandard and metric/customary). / MA.B.2.3.2 Solves problems involving units of measure and converts answers to a larger or smaller unit within either the metric or customary system. : 0002695

12. Grades 6-8: B. Measurement / 2: The student compares contrasts and converts within systems of measurement (both standard/nonstandard and metric/customary). / MA.B.2.3.1 Uses direct (measured) and indirect (not measured) measures to compare a given characteristic in either metric or customary units.

Grades 6-8: B. Measurement / 3: The student estimates measurements in real-world problem situations. / MA.B.3.3.1 Solves real-world and mathematical problems involving estimates of measurements including length time weight/mass temperature money perimeter area and volume in either customary or metric units. / : 0001047

13. Grades 6-8: B. Measurement / 2: The student compares contrasts and converts within systems of measurement (both standard/nonstandard and metric/customary). / MA.B.2.3.1 Uses direct (measured) and indirect (not measured) measures to compare a given characteristic in either metric or customary units.

Grades 6-8: B. Measurement / 3: The student estimates measurements in real-world problem situations. / MA.B.3.3.1 Solves real-world and mathematical problems involving estimates of measurements including length time weight/mass temperature money perimeter area and volume in either customary or metric units. : 0002608

14. Grades 6-8: B. Measurement / 3: The student estimates measurements in real-world problem situations. / MA.B.3.3.1 Solves real-world and mathematical problems involving estimates of measurements including length time weight/mass temperature money perimeter area and volume in either customary or metric units. : 0002703

15. Grades 6-8: B. Measurement / 1: The student measures quantities in the real world and uses the measures to solve problems. / MA.B.1.3.2 Uses concrete and graphic models to derive formulas for finding rates distance time and angle measures. : 000489

16. Grades 6-8: B. Measurement / 1: The student measures quantities in the real world and uses the measures to solve problems. / MA.B.1.3.1 Uses concrete and graphic models to derive formulas for finding perimeter area surface area circumference and volume of two- and three-dimensional shapes including rectangular solids and cylinders. : 0001713

17. (none) 0002727

18. Grades 6-8: C. Geometry and Spatial Sense / 1: The student describes draws identifies and analyzes two- and three-dimensional shapes. / MA.C.1.3.1 Understands the basic properties of and relationships pertaining to regular and irregular geometric shapes in two and three dimensions. : 0001403

19. Grades 6-8: B. Measurement / 1: The student measures quantities in the real world and uses the measures to solve problems. / MA.B.1.3.1 Uses concrete and graphic models to derive formulas for finding perimeter area surface area circumference and volume of two- and three-dimensional shapes including rectangular solids and cylinders. : 0001645

20. Grades 6-8: C. Geometry and Spatial Sense / 3: The student uses coordinate geometry to locate objects in both two and three dimensions and to describe objects algebraically. / MA.C.3.3.2 Identifies and plots ordered pairs in all four quadrants of a rectangular coordinate system (graph) and applies simple properties of lines. : 000697

21. (none) 0002935

22. Grades 6-8: D. Algebraic Thinking / 1: The student describes analyzes and generalizes a wide variety of patterns relations and functions. / MA.D.1.3.2 Creates and interprets tables graphs equations and verbal descriptions to explain cause-and-effect relationships. : 000807

23. Grades 6-8: D. Algebraic Thinking / 1: The student describes analyzes and generalizes a wide variety of patterns relations and functions. / MA.D.1.3.2 Creates and interprets tables graphs equations and verbal descriptions to explain cause-and-effect relationships. : 0002303

24. Grades 6-8: D. Algebraic Thinking / 2: The student uses expressions equations inequalities graphs and formulas to represent and interpret situations. / MA.D.2.3.1 Represents and solves real-world problems graphically with algebraic expressions equations and inequalities. : 0000008

25. Grades 6-8: D. Algebraic Thinking / 2: The student uses expressions equations inequalities graphs and formulas to represent and interpret situations. / MA.D.2.3.1 Represents and solves real-world problems graphically with algebraic expressions equations and inequalities. : 0002328

26. (none) 0003152

27. Grades 6-8: A. Number Sense Concepts and Operations / 3: The student understands the effects of operations on numbers and the relationships among these operations selects appropriate operations and computes for problem solving. / MA.A.3.3.1 Understands and explains the effects of addition subtraction multiplication and division on whole numbers fractions including mixed numbers and decimals including the inverse relationships of positive and negative numbers. : 0001795

28. (none) 0002035

29. Grades 6-8: E. Data Analysis and Probability / 1: The student understands and uses the tools of data analysis for managing information. / MA.E.1.3.1 Collects organizes and displays data in a variety of forms including tables line graphs charts bar graphs to determine how different ways of presenting data can lead to different interpretations.
Grades 6-8: E. Data Analysis and Probability / 3: The student uses statistical methods to make inferences and valid arguments about real-world situations. / MA.E.3.3.1 Formulates hypotheses designs experiments collects and interprets data and evaluates hypotheses by making inferences and drawing conclusions based on statistics (range mean median and mode) and tables graphs and charts. / 0000710

30. (none) 0002305

31. Grades 6-8: E. Data Analysis and Probability / 2: The student identifies patterns and makes predictions from an orderly display of data using concepts of probability and statistics. / MA.E.2.3.2 Determines odds for and odds against a given situation. / 0002866

32. Grades 6-8: E. Data Analysis and Probability / 1: The student understands and uses the tools of data analysis for managing information. / MA.E.1.3.2 Understands and applies the concepts of range and central tendency (mean median and mode).

33. Grades 6-8: E. Data Analysis and Probability / 1: The student understands and uses the tools of data analysis for managing information. / MA.E.1.3.3 Analyzes real-world data by applying appropriate formulas for measures of central tendency and organizing data in a quality display using appropriate technology including calculators and computers.

34. Grades 6-8: E. Data Analysis and Probability / 1: The student understands and uses the tools of data analysis for managing information. / MA.E.1.3.3 Analyzes real-world data by applying appropriate formulas for measures of central tendency and organizing data in a quality display using appropriate technology including calculators and computers.

35. Grades 6-8: E. Data Analysis and Probability / 1: The student understands and uses the tools of data analysis for managing information. / MA.E.1.3.2 Understands and applies the concepts of range and central tendency (mean median and mode).

36. Grades 6-8: E. Data Analysis and Probability / 1: The student understands and uses the tools of data analysis for managing information. / MA.E.1.3.2 Understands and applies the concepts of range and central tendency (mean median and mode).

37. Grades 6-8: E. Data Analysis and Probability / 1: The student understands and uses the tools of data analysis for managing information. / MA.E.1.3.2 Understands and applies the concepts of range and central tendency (mean median and mode).

38. Grades 6-8: E. Data Analysis and Probability / 1: The student understands and uses the tools of data analysis for managing information. / MA.E.1.3.2 Understands and applies the concepts of range and central tendency (mean median and mode).

39. Grades 6-8: E. Data Analysis and Probability / 1: The student understands and uses the tools of data analysis for managing information. / MA.E.1.3.2 Understands and applies the concepts of range and central tendency (mean median and mode).

40. Grades 6-8: E. Data Analysis and Probability / 1: The student understands and uses the tools of data analysis for managing information. / MA.E.1.3.2 Understands and applies the concepts of range and central tendency (mean median and mode).

41. (none) 0000124
1: I. NUMBER SENSE, CONCEPTS, AND OPERATIONS
   A. Number Representation
   1. Integer, fraction, decimal, percent, scientific notation, exponent, negative

2: I. NUMBER SENSE, CONCEPTS, AND OPERATIONS
   C. Operations
   1. Selection and Comparison of Operations
   2. Estimation
      a. Estimation
      b. Length and distance

1: II. MEASUREMENT
   A. Systems of Measurement
   1. Standard/Nonstandard and Metric/Customary
      a. Unit of measure
      b. Conversion within customary or metric system

1: III. GEOMETRY AND SPATIAL SENSE
   B. Angles
   1. Angles
   C. Circles
   1. Characteristics and Measurement
      b. Area and circumference
   E. Right Triangles
   1. Pythagorean Theorem
   G. Two and Three-dimensional Shapes
   1. Basic Properties
   2. Measurement
      a. Area, volume, and surface area

1: IV. THE COORDINATE PLANE
   A. Number Line Graphing
   1. Real and Complex Number Systems
      a. Graphing specific points
   B. Geometric Measurements
   1. Rectangular Coordinate Systems
      a. Properties of lines

2: V. ALGEBRAIC THINKING
   A. Variable Representation
   1. Translating Number and Word Problems
   B. Equations and Inequalities
   1. One- and Two-step Problem Solving
      a. Plugging into a given equation
   2. Simplification

1: VI. DATA ANALYSIS AND PROBABILITY
   A. Information Management
   1. Data Collection and Organization
      a. Tables
   B. Probability
   1. Patterns and Predictions
      a. Permutations and combinations
   C. Statistical Methods
   1. Statistical Measures and Data Comparison
      a. Central tendency: mean, median, mode

3: VII. PATTERNS AND FUNCTIONS
   A. Patterns: Identification, Representation
   1. Numerical and Geometric Patterns
   B. Functions
   1. Rules and Algebraic Expressions

5 from Grades 6-8: A. Number Sense Concepts and Operations / 1: The student understands the different ways numbers are represented and used in the real world. / MA.A.1.3.1 Associates verbal names written word names and standard numerals with integers fractions decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios. - (3, 4, 7, 8, 9)
5 from Grades 6-8: A. Number Sense Concepts and Operations / 1: The student understands the different ways numbers are represented and used in the real world. / MA.A.1.3.2 Understands the relative size of integers fractions and decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios. - (3, 4, 7, 8, 9)
1 from Grades 6-8: A. Number Sense Concepts and Operations / 1: The student understands the different ways numbers are represented and used in the real world. / MA.A.1.3.3 Understands concrete and symbolic representations of rational numbers and irrational numbers in real-world situations. - (3)
3 from Grades 6-8: A. Number Sense Concepts and Operations / 1: The student understands the different ways numbers are represented and used in the real world. / MA.A.1.3.4 Understands that numbers can be represented in a variety of equivalent forms including integers fractions decimals percents scientific notation exponents radicals and absolute value. - (3, 4, 8)
2 from Grades 6-8: A. Number Sense Concepts and Operations / 2: The student understands number systems. / MA.A.2.3.1 Understands and uses exponential and scientific notation. - (3, 4)
1 from Grades 6-8: A. Number Sense Concepts and Operations / 3: The student understands the effects of operations on numbers and the relationships among these operations selects appropriate operations and computes for problem solving. / MA.A.3.3.1 Understands and explains the effects of addition subtraction multiplication and division on whole numbers fractions including mixed numbers and decimals including the inverse relationships of positive and negative numbers. - (27)
2 from Grades 6-8: B. Measurement / 1: The student measures quantities in the real world and uses the measures to solve problems. / MA.B.1.3.1 Uses concrete and graphic models to derive formulas for finding perimeter area surface area circumference and volume of two- and three-dimensional shapes including rectangular solids and cylinders. - (16, 19)
1 from Grades 6-8: B. Measurement / 1: The student measures quantities in the real world and uses the measures to solve problems. / MA.B.1.3.2 Uses concrete and graphic models to derive formulas for finding rates distance time and angle measures. - (15)
2 from Grades 6-8: B. Measurement / 2: The student compares contrasts and converts within systems of measurement (both standard/nonstandard and metric/customary). / MA.B.2.3.1 Uses direct (measured) and indirect (not measured) measures to compare a given characteristic in either metric or customary units. - (12, 13)
1 from Grades 6-8: B. Measurement / 2: The student compares contrasts and converts within systems of measurement (both standard/nonstandard and metric/customary). / MA.B.2.3.2 Solves problems involving units of measure and converts answers to a larger or smaller unit within either the metric or customary system. - (11)
4 from Grades 6-8: B. Measurement / 3: The student estimates measurements in real-world problem situations. / MA.B.3.3.1 Solves real-world and mathematical problems involving estimates of measurements including length time weight/mass temperature money perimeter area and volume in either customary or metric units. - (10, 12, 13, 14)
1 from Grades 6-8: C. Geometry and Spatial Sense / 1: The student describes draws identifies and analyzes two- and three-dimensional shapes. / MA.C.1.3.1 Understands the basic properties of and relationships pertaining to regular and irregular geometric shapes in two and three dimensions. - (18)
1 from Grades 6-8: C. Geometry and Spatial Sense / 3: The student uses coordinate geometry to locate objects in both two and three dimensions and to describe objects algebraically. / MA.C.3.3.2 Identifies and plots ordered pairs in all four quadrants of a rectangular coordinate system (graph) and applies simple properties of lines. - (20)
2 from Grades 6-8: D. Algebraic Thinking / 1: The student describes analyzes and generalizes a wide variety of patterns relations and functions. / MA.D.1.3.2 Creates and interprets tables graphs equations and verbal descriptions to explain cause-and-effect relationships. - (22, 23)
2 from Grades 6-8: D. Algebraic Thinking / 2: The student uses expressions equations inequalities graphs and formulas to represent and interpret situations. / MA.D.2.3.1 Represents and solves real-world problems graphically with algebraic expressions equations and inequalities. - (24, 25)
3 from Grades 6-8: E. Data Analysis and Probability / 1: The student understands and uses the tools of data analysis for managing information. / MA.E.1.3.1 Collects organizes and displays data in a variety of forms including tables line graphs charts bar graphs to determine how different ways of presenting data can lead to different interpretations. - (1, 2, 29)
5 from Grades 6-8: E. Data Analysis and Probability / 1: The student understands and uses the tools of data analysis for managing information. / MA.E.1.3.2 Understands and applies the concepts of range and central tendency (mean median and mode). - (32, 37, 38, 39, 40)
5 from Grades 6-8: E. Data Analysis and Probability / 1: The student understands and uses the tools of data analysis for managing information. / MA.E.1.3.3 Analyzes real-world data by applying appropriate formulas for measures of central tendency and organizing data in a quality display using appropriate technology including calculators and computers. - (32, 37, 38, 39, 40)
1 from Grades 6-8: E. Data Analysis and Probability / 2: The student identifies patterns and makes predictions from an orderly display of data using concepts of probability and statistics. / MA.E.2.3.2 Determines odds for and odds against a given situation. - (31)
8 from Grades 6-8: E. Data Analysis and Probability / 3: The student uses statistical methods to make inferences and valid arguments about real-world situations. / MA.E.3.3.1 Formulates hypotheses designs experiments collects and interprets data and evaluates hypotheses by making inferences and drawing conclusions based on statistics (range mean median and mode) and tables graphs and charts. - (1, 2, 29, 32, 37, 38, 39, 40)