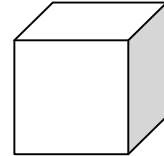


Show your work and/or explain your thinking for each problem.

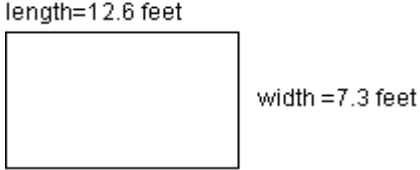
**Set 1**

- 1) A 140-pound student burns 5.4 calories per minute while playing tennis. After 60 minutes, how many calories has the student burned?
- 2) Sam drives at a constant rate of 60 miles per hour. How many hours will it take him to drive 210 miles? Express your answer as a mixed number.
- 3) A rectangle measures 3.9 cm by 9.1 cm. What is the area of the rectangle? ( $A=lw$ )
- 4) Amy's orchestra teacher is planning a fall concert. The cost of renting the music hall is \$2000. He decides to charge each person \$5.50 attend the concert to cover the cost of renting the hall. How many people will have to attend to cover the cost?
- 5) For every \$125 that Joe saves, his parents give him \$5. How much money will Joe have to save to get \$25 from his parents?
- 6) Erik's job pays \$6.50 an hour. How many hours will Erik have to work to earn \$78?
- 7) The cube shown has a surface area of 91.2 square cm. What is the area of each face?
- 8) Tom, Matt, and Jill went to lunch. Their bill is \$24.36. They want to leave **at least** a 15% tip. They also want to split the total bill, including the tip, evenly between the three of them. What is the minimum amount each person should leave?
- 9) What are the three smallest perfect squares that are multiples of three?
- 10) Mark bought three DVDs for \$19.99 each including tax. What was the total cost of the DVDs?



Show your work and/or explain your thinking for each problem.

### Set 2

- 1) Rory took the temperature at his house each morning at 7 am for a week. The temperatures were as follows: Sunday  $4^{\circ}$ , Monday  $-2^{\circ}$ , Tuesday  $-1^{\circ}$ , Wednesday  $6^{\circ}$ , Thursday  $-5^{\circ}$ , Friday  $3^{\circ}$ , and Saturday  $-4^{\circ}$ . Write these temperatures in order from least to greatest.
- 2) Name all the perfect squares between 200 and 500.
- 3) The boiling point of oxygen is  $-193^{\circ}\text{C}$  and the boiling point of hydrogen  $-253^{\circ}\text{C}$ . Which of the two elements has the highest boiling point?
- 4) The product of  $\left(-\frac{2}{3}\right)\left(-\frac{5}{4}\right)$  is closest to which of the following numbers? Explain your thinking.
  - a.  $\frac{1}{2}$
  - b. 1
  - c. -1
  - d. -2
- 5) Kathy was sailing against a current. The current caused her boat to lose 7.2 miles in its forward progress over a  $2\frac{1}{4}$  hour time. What was her loss in miles per hour?
- 6) The temperature in Toronto, Canada is  $-13^{\circ}\text{C}$ . The temperature in Buffalo, NY is  $7^{\circ}\text{C}$  warmer. What is the temperature in Buffalo?
- 7) The length of the rectangle shown is increased by 2 feet and the width is decreased by 2 feet. What is the difference between the areas of the two rectangles? ( $A=lw$ )

The diagram shows a rectangle with a horizontal top side labeled "length=12.6 feet" and a vertical right side labeled "width=7.3 feet".
- 8) For each of the following numerical expressions decide where the decimal point goes without actually doing the problem. Explain your reasoning.
  - a.  $25.22 \times 5.5 = 13871$
  - b.  $5.4 \times .35 = 189$
  - c.  $125.2 \times .55 = 6886$
- 9) The doctor took Bill's temperature. The thermometer reads in tenths so the doctor rounded Bill's temperature to  $102^{\circ}$ . What could Bill's actual temperature have been? Give three different possible temperatures.
- 10) A diver dove 43 feet below the surface of the ocean. She then rose 18 feet. How many feet below the surface of the ocean was the diver?

Show your work and/or explain your thinking for each problem.

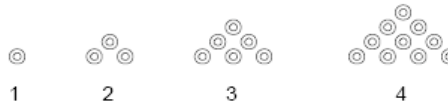
### Set 3

- 1) The Holm Middle School Football team made four plays during the last two minutes of the game. The plays went as follows. They gained 6 yards, lost 8 yards, gained 10 yards, then lost 2 yards. How many yards did they gain or lose during the last two minutes of the game?
- 2) Colin wants to determine his batting average for the season. A baseball player's batting average is determined by dividing the number of hits by the number of times he/she was at bat using the given ratio.  $\frac{\text{number of hits}}{\text{number of times at bat}} = \text{batting average}$   
Colin scored 38 hits in 155 times at bat. What is his batting average rounded to the nearest thousandth?
- 3) In science class, Maria measures the temperature of a cup of water every 5 minutes. The starting temperature is 68°F. If the temperature drops 4°F every 5 minutes, what will the temperature be after 20 minutes?
- 4) The lowest temperature ever recorded in the contiguous United States was 69.7° F on January 20, 1954 in Montana. Hawaii is the only state in the United States that has never had a temperature below 0° F. The lowest temperature ever recorded in Hawaii was 12° F. What is the difference between the two temperatures?
- 5) Determine the volume of a rectangular prism whose height, length and width are 2.5 cm,  $4\frac{3}{4}$  cm, and 5 cm, respectively.  $V = l * w * h$
- 6) Melanie sleeps an average of 8 hours each night. At the end of a 30 day month, how many hours has she slept?
- 7) An oil company drilled 234 feet into the earth in 6 days. How many feet did they drill each day?
- 8) Mike and three of his friends went to the movies. The movie tickets were \$6 each. They each bought popcorn for \$4 and a soda for \$1.75. How much did it cost them altogether?
- 9) The lowest temperature ever recorded in Florida was 2° F in Tallahassee in 1899. The highest temperature ever recorded in Florida was 109° F in Monticello in 1931. What is the difference between the two temperatures?
- 10) Determine the unit price, to the nearest penny, for the following:
  - a) 6 apples for \$2.30
  - b) 4 hotdogs for \$1.50
  - c) 10 pounds of potatoes for \$2.99

Show your work and/or explain your thinking for each problem.

#### Set 4

- 1) Dave and Anita each earned the same amount of money selling newspapers, but each worked a different number of days. Dave worked for 8 days. He earned \$15 less per day than Anita did. Anita worked for 4 days. How much did each earn altogether? How much money did each earn per day?
- 2) I am thinking of a number. If you multiply it by 7, then add 15, and finally subtract  $3^2$  you get 48. Write and solve an equation that describes the number(x) that I am thinking of.
- 3) The product of two whole numbers is 48 and their sum is less than or equal to 20. What are all the possibilities for the two whole numbers?
- 4) A number represented by the following pattern is called a triangular number. The number of dots in the first figure is referred to as the first triangular number; the number of dots in the second figure is referred to as the second triangular number, and so on. Determine the 5<sup>th</sup>, 6<sup>th</sup>, and the 15<sup>th</sup> triangular number by extending the pattern. .



- 5) Light travels at approximately 186,000 miles per second. Approximately how far will it travel in 1 minute? Express your answer in scientific notation.
- 6) The sun is approximately 93,000,000 miles from Earth. About how long does it take light to travel from the Sun to the Earth? Remember that light travels at approximately 186,000 miles per second.
- 7) On July 15, 2007, the National Debt of the United States of America was a little more than 8.8 trillion dollars. At that time, the population of the United States was a little more than 300 million. Approximately how much money would each of the 300 million people living in the United States have to give the government to pay off the National Debt? Assume every person pays an equal amount.
- 8) Coral takes a 10" by 14" rectangular sheet of paper and cuts a 2" by 2" square out of each corner. The paper is then folded up to make an open box. What is the volume of the box?
- 9) A rectangular garden with dimensions five meters by six meters has a sidewalk 1 meter wide all the way around it. What is the total area of the garden and the sidewalk?
- 10) What is the sum of the first two odd numbers? What is the sum of the first three odd numbers? What is the sum of the first 4, 5, and 25 odd numbers? What is the sum of any number (n) of odd numbers? Explain your reasoning.

Show your work and/or explain your thinking for each problem.

### Set 5

1) A scalene triangle has side lengths of  $x$ ,  $x + 2$  and  $2x + 1$ . Write and then simplify a variable expression that could be used to determine the perimeter of the triangle.

2) Calculate the following products:

$$7 \times 9$$

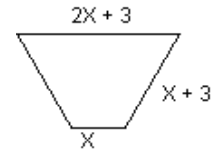
$$7 \times 99$$

$$7 \times 999$$

What would be the product of  $7 \times 9999$  be? What about the product of  $7 \times 9999999999$ ?

Write a rule that could be used to multiply 7 by any number of 9s **without** actually doing the multiplication. Explain your reasoning

3) Write and then simplify a variable expression that could be used to determine the perimeter of the isosceles trapezoid shown.



4) A poster's length is 2 times its width. Write an expression that describes the length ( $l$ ) in terms of its width ( $w$ ).

5) It is the grand opening of a local grocery store. Every 10th customer will receive a coupon for a free loaf of French bread and every third customer will receive a coupon for a soda. If 300 customers come in on opening day, how many will get a free loaf of French bread **and** a free soda?

6) Jeremy is having a party for 30 people. He is planning serving chicken fingers and chicken wings as appetizers. Jeremy figures that each person will eat four chicken fingers and five chicken wings. How many of each will he need?

7) April and two friends are going camping. They need to buy three sleeping bags at \$80 each, and three backpacks at \$55 each. Use the expression  $3(80 + 55)$  to find the cost of the camping equipment.

8) The whole numbers are listed in order and placed in a triangular arrangement as shown. Each row has two more numbers in it than the row before. What is the first number in the row containing the number 81?

			1	2			
		3	4	5	6		
	7	8	9	10	11	12	
13	14	15	16	17	18	19	20

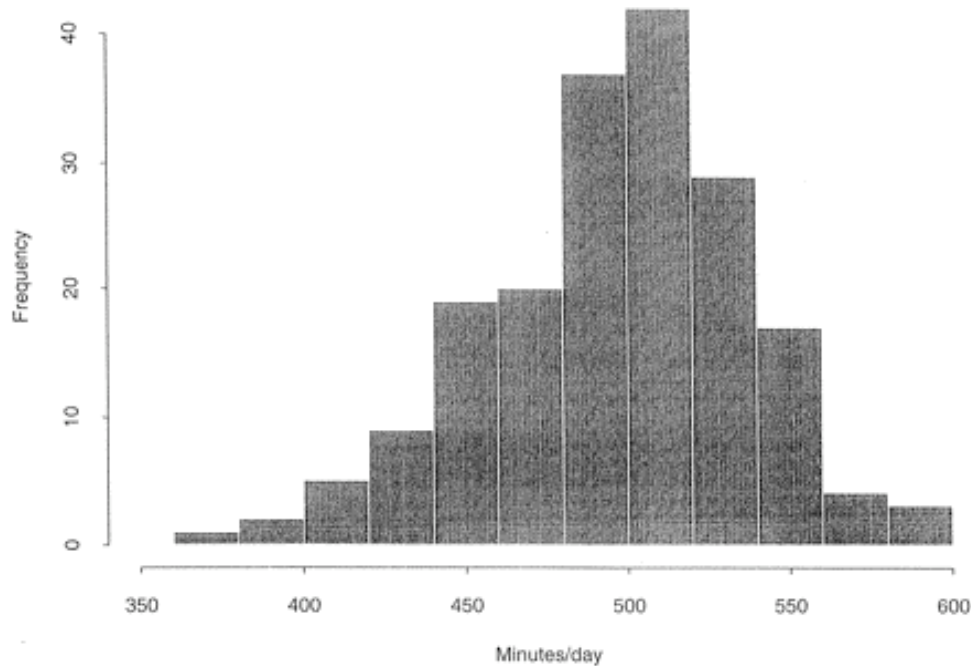
9) In astronomy a light year is 5,880,000,000,000 miles. Express this number in scientific notation. The star nearest to the Earth is about 4.3 light years away. Approximately how many miles away is the nearest star? Express your answer in scientific notation.

10) What is the units digit (digit in the ones place) of  $7^{21}$ ?

Show your work and/or explain your thinking for each problem.

### Set 6

- 1) I am thinking of a two-digit prime number. When multiplied by the square root of 36 the result is 222. What is the number?
- 2) The temperature for the last 12 hours has dropped at an average rate of  $3^{\circ}$  per hour. I the temperature is  $-5^{\circ}$  now. What was it 12 hours ago?
- 3) In January 2003, Pediatrics Magazine published an article relating caffeine consumption to the sleep habits of sixth, seventh, and eighth-grade students in the United States. 191 students participated in the survey. The histogram below shows the results of the survey. **Note:** each bar is an interval of 20 minutes.



Copyright ©2003 American Academy of Pediatrics (Permission to use the graphs for educational purposes are contained within the article.)

- a. What is the range of the data?
- b. What is the mode of the data?
- c. Do you think the average middle school student gets enough sleep?  
Explain your reasoning.

Show your work and/or explain your thinking for each problem.

**Set 6 continued**

- 4) The students in Ms. Benda's third period class were so interested in the data relating caffeine consumption and minutes of sleep, they decided to conduct their own survey. They surveyed 15 eighth graders at their school to find out how many sodas or cups of coffee, with caffeine, they drank the day before and how many hours of sleep they got. The data is shown in the table below. Use the data from the table to create a scatter plot. Make sure to include a title and labels.

Student Number	Number of Caffeinated drinks	Hours of sleep
1	0	9
2	0	8
3	1	9
4	1	6
5	1	10
6	2	9
7	2	7
8	2	6
9	2	8
10	2	9
11	2	10
12	3	7
13	3	8
14	3	5
15	6	7

- 5) Melanie has \$85. She wants to buy DVDs. If each DVD cost \$21.50, how many can she purchase?
- 6) Ms. Goshen placed an ad in the newspaper to advertise a garage sale. The newspaper charges \$7 per line of newsprint. Her ad takes three lines. Write and solve an equation that could be used to find the cost of her ad ( $c$ ) in terms of the number of lines ( $l$ ). Use the equation you wrote to determine the maximum number of lines she can afford with \$20.
- 7) The temperature in Mr. Custer's classroom was  $72.68^{\circ}\text{F}$ . The outside door was left open and the temperature dropped by  $5.7^{\circ}\text{F}$ . Carl turned up the thermometer and the classroom temperature rose by  $8.25^{\circ}\text{F}$ . What was the temperature now?
- 8) To park at the airport it costs \$5.00 for the first hour and \$3.50 for each additional hour or fraction of an hour. Write an equation that could be used to determine to the total cost for parking where  $c$  represents the cost and  $h$  represents the time in hours.
- 9) Use the equation you wrote for problem 9 to determine the maximum number of hours Ken can park with \$14.00.
- 10) Is the quotient of  $5\frac{2}{3} \div \frac{4}{5}$  going to be more or less than 6? Explain your reasoning.

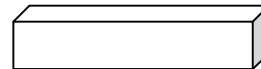
Show your work and/or explain your thinking for each problem.

**Set 7**

- 1) Sue deposits \$57.25 into her checking account. Her new balance is \$364.37. Find the balance before the deposit.
- 2) The formula for area of a triangle is  $A = \frac{1}{2}bh$ . The area of a triangle is 75.52 square cm. The base of the triangle is 11.8 cm. What is the height of the triangle?
- 3) The perimeter of a triangular region is 10 meters. Two of the sides measure 3.2 meters and 4.5 meters respectively. Find the length of the third side.
- 4) Jacob buys a book with 495 pages. He reads an average of 30 pages every hour. At this rate how many hours will it take Jacob to finish read the book?
- 5) Maria earns \$6.50 per hour cleaning. After 5.5 hours, how much money has she earned?
- 6) Sammy rents four movies at \$3.99 each. What is the total cost for the four movies?
- 7) Ken's bank pays him \$0.16 for every \$10.00 he saves for a year. He deposits \$1000 and keeps it in the bank for 1 year. How much interest did the bank pay him?
- 8) Veronica's car has an automatic transmission. She started the car, drove 10 miles, spent 3 minutes with the car idling at traffic lights, and then drove another 10 miles. Use the table to find how much gasoline Veronica's car used?

Non-Moving	Gallons used	Moving	Gallons used
Starting the Car	.015	Stick Shift (30 miles)	.75
Idling per Minute	.047	Automatic (30 miles)	1.05

- 9) The rectangular prism shown has a height of 5 cm, a width of 5 cm, and a length of 20 cm. What is the surface area of the prism shown?

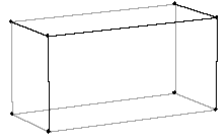


- 10) Candis is planning her birthday party. Her mother has given her a budget that includes \$120.00 for food. A restaurant has given her an estimate of \$195.00 for food for 30 people. How many people can Candis invite with the budget her mother has given her?



Show your work and/or explain your thinking for each problem.

### Set 8

- 1) Mr. Jones purchases a sofa and chair for \$899. He makes a down payment of \$247 and plans on making payments of \$50 per month until the balance is paid off. How many months it will take Mr. Jones to pay off the sofa and chair.
  - 2) Maggie took 7 hours to cover a certain distance at an average speed of 42 miles per hour. What will her average speed be if she covers the same distance in 6 hours?
  - 3) Ann's class is taking a trip to Los Angeles. She needs \$250 for the trip and has already saved \$85. Ann figures she can save \$50 per month. How many months will it take her to save the remainder of the money for the trip?
  - 4) Sue buys a CD player for \$170. She pays \$25 towards the bill and her parents pay the remaining balance. Sue has to pay her parents back in 5 months. If she gives her parents the same amount each month, what will her monthly payment be to her parents?
  - 5) The side lengths of a scalene triangle are prime numbers. The length of the triangle's perimeter is also a prime number. What is its smallest possible perimeter?
  - 6) The diagram below shows the wire framework for a rectangular box. The length of this box is eight cm. greater than the width and the height is half the length. A total of 108 cm of wire was used to make this framework.  
What are the dimensions of the box?  
What is the volume of the box?
- 
- 7) Laura orders three pizzas for \$5.00 each. She also orders one box of cinnamon sticks. Her total bill is \$17.99. What is the cost of the cinnamon sticks?
  - 8) Jake took his cat to the vet. The vet charged \$30 for an office visit and \$15 per shot. Write an equation that could be used to determine the total cost of Jake's visit to the vet. Use (C) to represent to total cost and (s) the number of shots. Use the equation you wrote to determine the number of shots Jake's cat received if the total bill was \$75.00.
  - 9) One number is eight more than another. If the sum of the two numbers is 54, what is the smaller of the two numbers? Write and solve an equation that could be used to determine the two numbers.
  - 10) The ratio of two supplementary angles is 7 to 2. What is the measure of each of the angles? Write and solve an equation that could be used to determine the two angle measures.

Show your work and/or explain your thinking for each problem.

**Set 9**

- 1) A plumber charges \$55 for a service call and \$35 per hour. Write an equation that could be used to determine the total cost (c) in terms of hours (h). The total bill for a recent job was \$160. Use the equation you wrote to determine how many hours the plumber worked.
- 2) Dr. Moore charges \$75 for an eye exam and \$150 for each pair of eyeglasses. Paige decides to purchase two pairs of glasses. What will her total bill be for an exam and two pairs of glasses?
- 3) The top and bottom of the rectangular box shown each have an area of 24 square inches. Two sides of the box are 72 square inches each and the front and back are 48 square inches each. What are the dimensions of the box?



- 4) There is a pattern to the sum of the interior angles of any polygon. The table below gives the number of sides for the first 10 polygons and the sum of their interior angles. Complete the table.

Number of sides	3	4	5	6	7	8	9	10
Name of polygon	triangle	quadrilateral	pentagon	hexagon	heptagon	octagon	nonagon	decagon
Sum of the interior angles	180°	360°	540°					

- 5) The product of the page numbers from two facing pages in a book is 5402. What are the two page numbers?
- 6) Janice bought pencils that cost \$0.29 each and a notebook for \$2.19. The total cost for all items was \$3.93. How many pencils did she purchase?
- 7) 240 gallons of water is poured into an empty tank. The tank is now  $\frac{3}{4}$  full. How many gallons can the tank hold when full?

3	9	27
2	4	8
0	0	0
5		125
4	16	
	49	
		1000
6		216

Show your work and/or explain your thinking for each problem.

- 8) The table shows triple number patterns. Discover the rule and fill in the missing numbers. What is the rule?
  
  
  
  
  
  
  
  
  
  
- 9) A square has side lengths of  $3n$ . What is the perimeter of the square? Express your answer in simplest form.
  
  
  
  
  
  
  
  
  
  
- 10) At Mountain Basin Middle School there are 680 girls and 765 boys. What is the ratio of boys to girls? What is the ratio of boys to total number of students? Express your answers in simplest form.

Show your work and/or explain your thinking for each problem.

### Set 10

- 1) At 32 degrees F, water freezes and becomes ice. At temperatures above 32 degrees F, the ice melts to water. Write an inequality that represents all temperatures where water is frozen.

- 2) There is a pattern to repeating decimals where the divisor is seven or a multiple of seven. Use the quotients given to answer the questions below.

$$\frac{1}{7} = .14285714285714... \text{ or } \overline{.142857}$$

$$\frac{2}{7} = .28571428571428... \text{ or } \overline{.285714}$$

$$\frac{3}{7} = .4285714285714... \text{ or } \overline{.428571}$$

- The first digit in the quotient of  $\frac{4}{7}$  is a 5. Write the quotient of  $\frac{4}{7}$  as a repeating decimal **without** actually doing the division. Explain your reasoning.
- The first digit in the quotient of  $\frac{5}{7}$  is a 7. Write the quotient of  $\frac{5}{7}$  as a repeating decimal **without** actually doing the division. Explain your reasoning.

- 3) In order to keep food safe, the refrigerator temperature cannot exceed 40 degrees F. To keep from freezing, the refrigerator temperature must be greater than 32 degrees F. Graph an inequality to show this temperature range.

- 4) I am thinking of two numbers whose difference is 30 and whose product is  $-200$ . What are the two numbers?

- 5) The length of a chain is 46 inches. Ted cuts the chain into two pieces, so that one of the pieces is 6 inches longer than the other. How long is each piece? Write and solve an equation that could be used to solve determine the length of each piece.

- 6) Last year, a hotel in NYC had 144,000 visitors including 45,000 teens. This year, the hotel had 160,000 visitors including 56,000 teens. In which year was the fraction of teens the greatest?

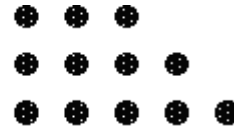
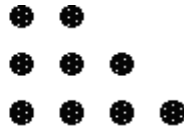
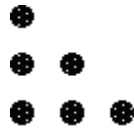
- 7) You jog every 3<sup>rd</sup> day and take dance lessons every Wednesday. Today you jog and have dance class. In how many days will you next jog and have dance lessons on the same day?

- 8) Nancy walks 5.9 kilometers per hour and jogs 8.5 kilometers per hour. One Sunday she walks for  $1\frac{1}{4}$  hours and then jogs for 30 minutes. How far did she travel altogether?

Show your work and/or explain your thinking for each problem.

**Set 10 continued**

- 9) The figures below show a sequence of arrangements of dots. Use the diagram to answer the questions below.



- a) Sketch Figure 4 and Figure 5.
- b) Create a t-chart that represents the number of dots it takes to create the first seven figures.
- c) How many dots would it take to make the 15<sup>th</sup> figure? How many dots would it take to make the 100<sup>th</sup> figure? Explain your thinking and show your work.
- d) What is the rule for the  $n$ th figure?
- 10) Use the t-chart from problem 9 to create a coordinate graph representing the number of dots for the first 7 figures. The figure number is represented by the x-coordinate and the number of dots is represented by the y-coordinate. Make three observations about the graph. Be specific.

Show your work and/or explain your thinking for each problem.

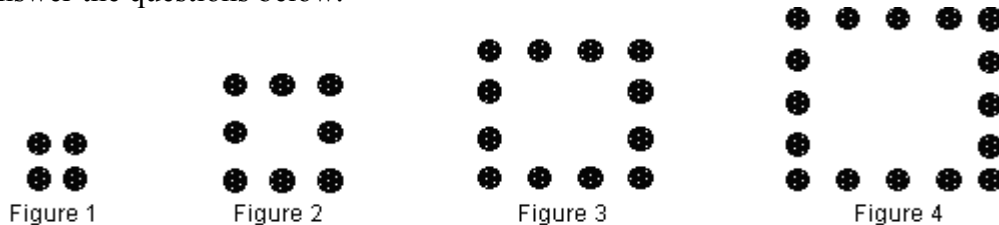
### Set 11

- 1) The cost of renting a four-wheeler is \$100 per day or \$29.50 per hour. You are going to use the four-wheeler for  $3\frac{1}{2}$  hours. Is it cheaper to rent the four-wheeler by the day or by the hour?
- 2) Jamie collects baseball cards and has 180 different cards. He is designing a rectangular frame to display the cards. He wants the cards to be arranged in rows and columns with an equal number of cards in each row. One example would be one column with 180 rows. How many different ways could Jamie display his cards?
- 3) What is the GCF (greatest common factor) of 24, 40, and 56?
- 4) What is the LCM (least common multiple) of 90, 36, and 54?
- 5) Find the product of the greatest common factor and least common multiple of 24 and 32.
- 6) Two positive numbers have an LCM of 144 and a GCF of 12. One of the numbers is 36. What is the other number?
- 7) Tina is making gift bags for her friends in school. She has 225 gumballs, 75 candy bars and 150 jawbreakers. Each bag must have the same number of gumballs, candy bars, and jawbreakers. What is the maximum number of gift bags can she make so that each bag has the same number of each type of candy?
- 8) The sum of a number (x) and 7 increased by 22 is less than 116. Write and solve an inequality that could be used to determine all possible values for x.
- 9) Mr. Smith has a class of 23 students and six students earned an A. In Mr. Johnson's class, 7 out of 25 students received an A. In which class did a greater fraction of students receive an A?
- 10) Kelli is designing a rectangular box that will hold 36 tennis balls. The box must only be one layer deep. One possible box is one tennis ball wide by one tennis ball deep by 36 long. Kelli does not think that design is very practical. List all possible arrangements of 36 tennis balls Kelli could create if they can only be one layer deep.

Show your work and/or explain your thinking for each problem.

### Set 12

- 1) The volume of the earth is about 259,000,000,000 cubic miles. What is this number in scientific notation?
- 2) Wesley's brother is  $\frac{1}{5}$  his father's age. His father is 3 times as old as Wesley is. Wesley is 20 years old. How old are Wesley's father and his brother?
- 3) Samantha started on the fifth floor of a building, rode an elevator up eight floors. She then went down three floors, then down seven more floors. On what floor was she then?
- 4) What is the units digit (ones place) of  $6^{62}$ ?
- 5) The Nelson family bought a house for \$60,500 in 1983. In 1999 the house was worth \$185,300. Assuming the value of the house increases at the same rate, what will the Nelson's house be worth in 2007?
- 6) The four figures below show a sequence of arrangements of dots. Use the diagram to answer the questions below.



Create a t-chart showing the number of dots in the first 10 figures.

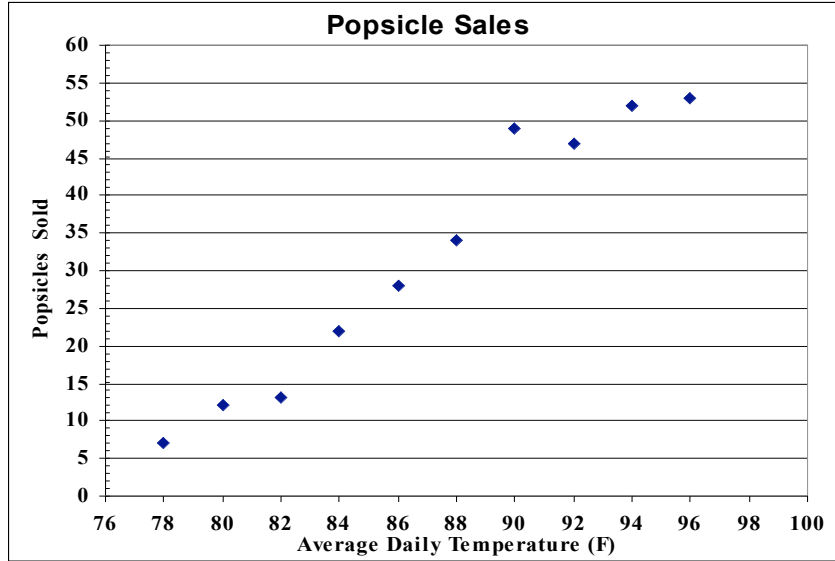
- a) How many dots would it take to create the 15<sup>th</sup> figure? Explain.
  - b) How many dots would it take to create the 100<sup>th</sup> figure?
  - c) What is the rule for the nth figure? (n meaning any figure number)
- 7) Use the t-chart from problem 6 to create a coordinate graph representing the number of dots for the first 5 figures. The figure number is represented by the x-coordinate and the number of dots is represented by the y-coordinate. Make three observations about the graph. Be specific.
  - 8) Write an equation for each of the following, then solve for the indicated number.
    - a) The sum of a number and three is 10. Find the number.
    - b) The difference of twice a number and four is ten. Find the number.
    - c) If four times a number is increased by three, the result is twenty-seven. Find the number.

Show your work and/or explain your thinking for each problem.

**Set 12 continued**

- 9) The scatter plot shown shows the relationship between the numbers of popsicles sold at the student store over a ten-week period and the average daily temperature.

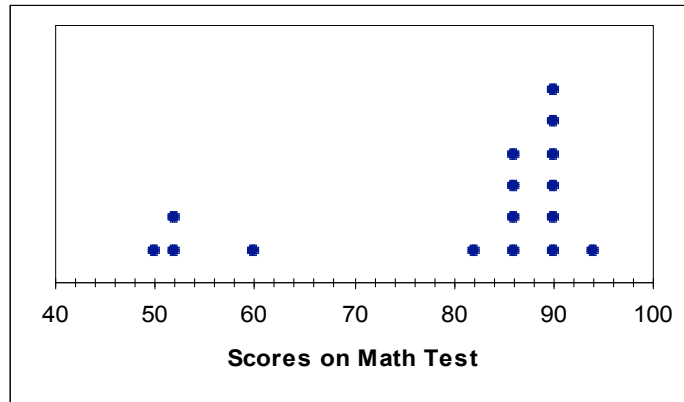
a) How



many

- popsicles were sold when the average daily temperature was 78° ?
- b) What was the temperature the week 34 popsicles were sold?
- c) Approximately how many more popsicles were sold when the temperature was 98 degrees than when it was 78 degrees?

- 10) The line plot below shows the scores on a math test for Ms. Brown's third period class.



- a) What is the median score?
- b) What is the mode of the data?
- c) What is the mean average score?
- d) Which measure of central tendency best describes the class scores? Mean, median, or mode? Explain your reasoning.



Show your work and/or explain your thinking for each problem.

**Set 13**

- 1) The school record for the long jump is  $18\frac{3}{4}$  feet. Your record is 16 feet 11 inches. How much further must you jump to match the school record? Express your answer as a mixed number.

- 2) A cookie recipe calls for one  $\frac{2}{3}$  cups of sugar. A cake recipe calls for  $2\frac{3}{4}$  cups of sugar. How much sugar is needed for both recipes? Express your answer as a mixed number in simplest form.

- 3) The diameter of a circle is 16 cm. What is the area of the circle? Express your answer in terms of  $\pi$  (pi).

- 4) The table below shows the amount of time Sarah spent on her homework during one week. What fractional part of the total time does Thursday represent? Express your answer in simplest form.

Monday	Tuesday	Wednesday	Thursday	Friday
$1\frac{1}{2}$ hour	50 minutes	$1\frac{1}{4}$ hour	40 minutes	1 hour

- 5) The sum of  $\frac{1}{3}$  and what number equals  $\frac{7}{8}$ ? Express your answer in simplest form.

- 6) The product of  $\frac{9}{10}$  and what number equals  $\frac{6}{25}$ ? Express your answer in simplest form.

- 7) The quotient of a number and  $2\frac{3}{4}$  equals  $13\frac{3}{4}$ . What is the number? Express your answer in simplest form

- 8) You are wrapping two presents. You need  $3\frac{1}{2}$  feet of ribbon for the first package and  $2\frac{3}{4}$  feet of ribbon for the second package. You have 10 feet of ribbon. How many feet of ribbon will you have left after wrapping both packages?

- 9) Write an equation for each of the following, then solve for the indicated number.

- a) Three times a number divided by 2 is 12. What is the number?
- b) The quotient of a number and 5 is 9. What is the number?
- c) The quotient of a number and one-fifth is 50. What is the number?

- 10) What is the sum of the reciprocals of all the positive integer factors of six? Express your answer in simplest form

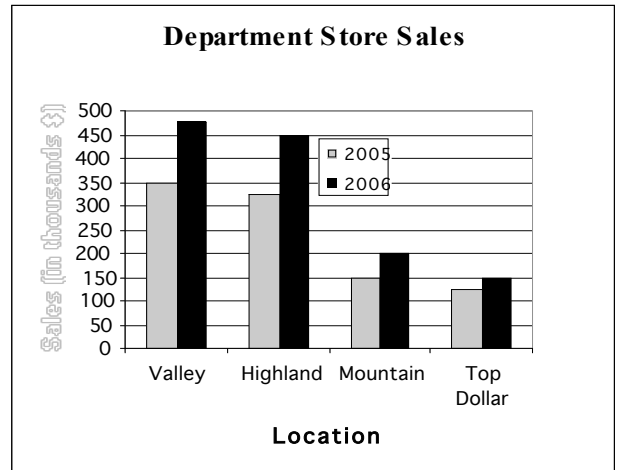
Show your work and/or explain your thinking for each problem.

### Set 14

- 1) Tammy's mom baked chocolate chip cookies. Tammy ate  $\frac{1}{3}$  of the cookies. Her brother Tom ate  $\frac{1}{3}$  of the **remaining** cookies. Finally Tammy's dad ate the eight cookies that that were left. How many cookies did her mother bake?

- 2) The graph at right shows the sales at Four stores for the years 2005 and 2006. The numbers are in thousands. Use the graph to answer the following questions.

- a) How much did Valley's sales increase from 2005 to 2006?  
b) How much more did Highland sell than Mountain during 2006?

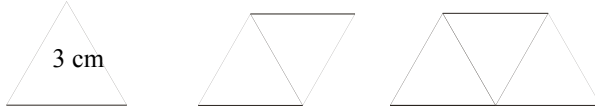


- 3) Tori bought 140 oranges for \$28. When she got them home she discovered that  $\frac{1}{5}$  of them were spoiled. If she figures she spent the \$28 on only the good oranges, how much did each of the good oranges cost?
- 4) Tom has a rope that is 27 inches long. He wants to cut the rope into pieces that are  $\frac{1}{8}$  yard long. How many pieces that are  $\frac{1}{8}$  yard long will Tom cut the rope into?
- 5) Ms. Mills asked her fifth period class what sports they played. She found that  $\frac{1}{2}$  the class plays basketball but does **not** play hockey. She also found out that  $\frac{1}{12}$  plays hockey but does **not** play basketball. What fraction of Ms. Mill's fifth period class does **not** play basketball or hockey?
- 6) Mr. Robert's class is raising money for a field trip by selling fudge. They made 6 pounds of fudge and plan on putting it in 4 ounce packages to sell. The will sell each package for \$5. How much money will the collect if they sell all the fudge?
- 7) Mary has  $15\frac{1}{2}$  yards of fabric to make curtains. This is  $\frac{2}{3}$  of the fabric that she needs. How much fabric does she need? Express y our answer as a mixed number in simplest form.

Show your work and/or explain your thinking for each problem.

**Set 14 continued**

- 8) At a high school football game,  $\frac{3}{4}$  of the people in attendance are fans of the home team. There are 342 fans of the home team. How many people are in attendance? .
- 9) The three figures below show a sequence of arrangements of equilateral triangles. The side length of each triangle is 3 cm as labeled. Use the diagram to complete the table. Explain your thinking.



Number of Triangles	1	2	3	4	5	8	12	25	100	1000
Perimeter of Figure in cm	9	12								

- 10) Use the data table from problem 9 to complete the following:
- List the first 6 ordered pairs that describe the relationship between the number of triangles and the perimeter. For example the first ordered pair is (1, 9)
  - Create a coordinate graph that represents the first five ordered pairs. Be sure to label all parts of the graph and give it a title.
  - Write a rule for any number of triangles (N triangles).

Show your work and/or explain your thinking for each problem.

### Set 15

- 1) Paul had a bag of 128 apples. He sold 25% of them to Anastasia. Next he sold 25% of the remaining apples to Suzanne. Of those apples still in his bag, he gave the shiniest one to his teacher. How many apples remain in the bag after Paul gave one to the teacher?
- 2) Your boss tells you she is going to raise your salary by 10%. Three months later she tells you that business is bad and she is going to have to reduce your salary by 10%. Are you making more or less than your original salary? By what percent did it change?
- 3) Paul's dog eats  $\frac{2}{3}$  cup of food each day. Paul has 33 cups of food. How many days worth of dog food does he have?
- 4) Jayden bought his stereo in a state where the sales tax is 7%. He paid \$588.50 for it including the tax. How much money could he have saved if he had bought it in a state without sales tax?
- 5) Dawn has a piece of construction paper that is 15 inches wide. She wants to cut the paper into strips that are  $\frac{2}{3}$  inch wide so she can make paper chains. What is the maximum number of paper strips she can cut?
- 6) Mike has a wooden board that he is using to make shelves. The board is 10 feet long. He wants to make each shelf 18 inches long. How many 18-inch shelves can he cut from the 15-foot board?
- 7) The width of the United States flag is called its hoist and the length is called the fly. There is an official ratio of the hoist compared to the fly of 1 to 1.9. If the hoist of a flag is 20 feet, what does its fly have to be?
- 8) Take a number and increase it by 30%. Then decrease this result by 30%. Did you end up with the same number? Explain why this happened.
- 9) If  $x\%$  of 375 is 420, then which of the following must be true? Explain your thinking.
  - a)  $10 \leq x \leq 25$
  - b)  $26 \leq x \leq 100$
  - c)  $101 \leq x \leq 150$
  - d)  $151 \leq x \leq 200$
- 10) The Firebird Band is planning a trip to Europe during summer vacation. The exchange rate at the time of their trip was 1 US dollar was equal to about 0.73 Euros. Joanna traded in \$200 US dollars. Approximately how many Euros did she get?

Show your work and/or explain your thinking for each problem.

**Set 16**

- 1) Jaime is wrapping gifts to raise money for art club.  $\frac{1}{5}$  of the money they earn wrapping the gifts goes to pay for the wrapping paper and another \$.25 for ribbons and tape. Write an equation that could be used to determine how much of the total money (t) they take in will be actual profit (p)?
- 2) The Build a Better Cupcake Company had 70 employees last year. This year they expect to increase the number of employees by 20%. How many employees will the company have at the end of this year?
- 3) Your cat eats  $\frac{1}{3}$  cup food in the morning and  $\frac{1}{6}$  cup at night. You have 20 cups of food. What is the maximum number of days the food will last?
- 4) You have \$50 and want to buy a shirt and pants. You found a shirt for \$27. Write an inequality that represents the maximum amount of money you could spend on a pair of pants.
- 5) A box of cereal cannot contain more than 7% sugar by weight. A box of cereal weighs 18 ounces. What is the maximum number of ounces of sugar the cereal can contain?
- 6) Phillippe opened a savings account with an initial deposit of \$130. Phillippe plans to save most of his allowance for the next 12 months. He is hoping to have at least \$910 at the end of the 12 months. Write and solve an inequality that could be used to determine the amount of money Phillippe must save every month to have at least \$910 in his savings account. Assume he saves the same amount every month.
- 7) One US dollar is worth about 0.49 British pounds. How many British pounds will it take to buy a pair of shoes that cost \$45 US dollars?
- 8) Two rectangular boxes have the same volume. One of the boxes is a cube. The other box measures 4" by 6" by 9". What is the length of the sides of the box that is a cube?
- 9) Which of the tables shown below show a linear relationship? Explain your reasoning.

X	1	2	3	4
Y	5	8	11	14

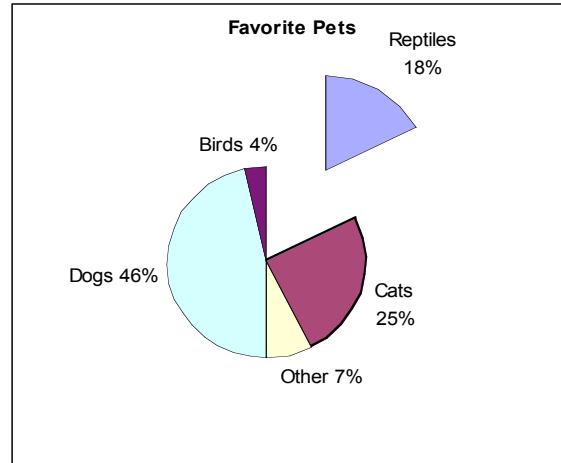
X	1	2	3	4
Y	.6	.3	0	-.3

X	3	4	5	6
Y	-5	-1	3	4

Show your work and/or explain your thinking for each problem.

### Set 16 continued

- 10) The eighth graders at Field Middle School were surveyed to determine their favorite pets. 140 students responded. The results of the survey are shown in the pie chart below.



Use the data from the chart to answer the questions below.

- How many of the 140 students said that cats were their favorite pets?
- How many of the 140 students said that reptiles were their favorite pets?
- How many more students said they liked dogs than cats?
- At least one of the answers to questions a through c are decimals. Does a decimal answer to these questions make sense? Why would that occur with a pie chart?

Show your work and/or explain your thinking for each problem.

**Set 17**

- 1) A motorcycle traveled 295 miles on 7 gallons of gasoline. How many miles per gallon is this?
- 2) Mr. Dalton has three 8<sup>th</sup> grade math classes. He is taking some of his students on a field trip. 70% of his first period,  $\frac{2}{3}$  of his second period, and .6 of his third period will be going. How many students from each of the classes are going on the field trip?
- 3) Nelson's grocery store sells a box of five ice cream sandwiches for \$2.20. They also sell a box of seven sandwiches for \$2.59. Which is the better buy?
- 4) 180 has exactly 18 factors. How many of them are divisible by six?
- 5) What is the least positive integer that meets all of the following conditions?  
Dividing by 3 leaves a remainder of 2.  
Dividing by 4 leaves a remainder of 3.  
Dividing by 5 leaves a remainder of 4. **59**
- 6) Missy travels 4 miles in 11 minutes. Mary travels 14 miles in 29 minutes. Missy and Mary are both traveling to a town that is 15 miles away. If they leave at the same time, who will arrive first?
- 7) Triangle ABC has vertices at (0, 0), (0, 5), and (5, 0). Triangle DEF has vertices at (0, 0), (0, 10), and (10, 0). How many times larger is the area of triangle DEF than triangle ABC?
- 8) Becky has 3 dozen birds that live in five different cages. The cages are red, yellow, blue, black, and silver. The silver cage has the most birds. The red cage has three birds, which is the least number of birds in one cage. The blue cage has three more birds than the red cage. The yellow cage has twice as many plus two more than the red cage. The silver cage has 10 birds. How many birds are in each of the cages?
- 9) Marla is trying to decide which of two jobs to take. One job offers a weekly salary of \$350... The other pays \$8.75 per hour. Is it better to receive \$350 a week or to be paid at an hourly rate of \$8.75 per hour? What factors could affect your decision?
- 10) A video game is on sale at 15% off the regular price. On Friday the price was marked down an additional 10%. The sale price after the two markdowns is \$32.13. What was the original price of the video game?

Show your work and/or explain your thinking for each problem.

**Set 18**

1) Juan can run 60 yards in 2 minutes. What is his rate of speed in feet per second?

2) Determine the unit rate for the following items and then arrange them from the **least** expensive to the **most** expensive.

Orange Juice	\$2.54 for 30 oz
Fruit Punch	\$1.59 for 20 oz
Bottled Water	\$1.79 for 20 oz
Energy Drink	\$2.75 for 6 oz.

3) A 21-foot tree casts a 6-foot shadow. How long would the shadow of a 14-foot flagpole be? Given that the flagpole's shadow is measured at the same location and at the same time as the tree.

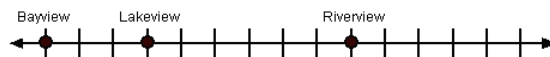
4) Melanie babysat for 6.25 hours and received \$25.00. At the same rate, what will she earn after 4 hours?

5) Three pair of pants cost \$16. What is the cost of seven pair of pants?

6) What is the mean average of the first 30 whole numbers?

7) Stephen bought a car for \$8,400. Stephen sold it to Tom for  $\frac{3}{4}$  the price he paid for it. Tom sold it to Maria for  $\frac{1}{2}$  the price he paid for it. Then Maria sold it to Nino for  $\frac{1}{3}$  the price she paid for it. How much did each person pay for the car?

8) The distance from Bayview to Lakeview is 60 miles. How far is it from Bayview to Riverview? Assume that the distance between tick marks is equal.



9) There are about 40 potatoes in a 10-pound bag. Greasy Burgers uses about three potatoes to make each jumbo order of French fries. They charge \$3.95 per order. One Thursday Greasy Burgers used 600 pounds of potatoes making jumbo orders of fries. Approximately how much money does the restaurant take in that day selling jumbo orders of fries?

10) I am thinking of a number. It is a multiple of 3 but not 6. It is greater than  $25^2$  but less than  $30^2$ . The units digit is a perfect square and the sum of the other two digits is the square root of 81. What is my number?

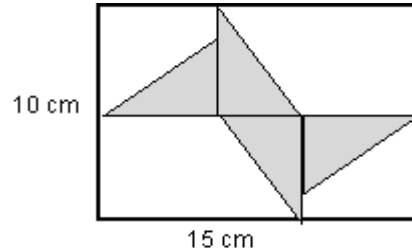


Show your work and/or explain your thinking for each problem.

**Set 19**

- 1) A three-dimensional model of a city has a scale of 1 inches = 2.5 foot. The actual distance between the two buildings is 120 feet. What is the distance on the scale model?

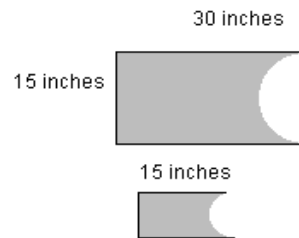
- 2) Four congruent triangles are arranged inside a rectangle. What is the area of one of the triangles? The figure is **not** drawn to scale.



- 3) Sondra bought a book for \$15.95, a shirt for \$25.50, and a pair of shoes for \$40.99. The sales tax is 7% and all three items are taxable. How much will Sondra pay for the three items including the sales tax? Round your answer to the nearest penny.

- 4) Exactly what time is it 245 seconds after 8:00 am?

- 5) The figures shown at right are similar. The cutouts at the ends of each figure are semicircles. What is the area of the small semicircle rounded to the nearest thousandth?



- 6) Name three integers, less than 100, with **exactly** three factors.

- 7) The perimeter of Square K is 48 cm. The area of Square M is  $\frac{1}{3}$  the area of Square K. Between what two integers is the side length of Square M?

- 8) Use the equations shown to solve for  $\triangle$  and  $\square$ .

$$\square + \triangle = 13$$

$$\triangle \times \square = 36$$

$$\triangle \times \triangle = 81$$

- 9) The area of a circle is  $81\pi$ . What is its circumference? Express your answer in terms of  $\pi$

- 10) The cylindrical water tank shown has a diameter of 20. The tank is partially filled with water. The water is 12 feet deep and covers the base of the tank. 1 cubic foot of space holds about 7.48 gallons. Approximately how many gallons of water are in the tank? Use  $\pi = 3.14$ .



Show your work and/or explain your thinking for each problem.

### Set 20

- 1) An architect draws a blueprint of a house. The scale is 1inch=40 ft. The distance from the front to the back of the house on the map is 3 inches. What is the actual distance of the house from front to back?
- 2) The length of common nails is measured in a unit called “pennies”. The abbreviation for pennies is d. The chart below shows the sizes and corresponding lengths of three common nails. Complete the chart and determine the length, in inches of a 10d nail. **Note:** after 10d the sizing changes.

Size of nail	2d	3d	4d	5d	6d	7d	10d
Inches	1.00	1.25	1.50				

- 3) Oh no, Phillip lost his change! This morning he had nine coins worth \$.042. How many nickels did Philip have?
- 4) A video tape can record 2 hours on short play, 4 hours on long play, or 6 hours on extra long play. After recording 32 minutes on short play and 44 minutes on long play, how many minutes can it record on extra long play?
- 5) A farmer grows 105 pounds of potatoes. He sells them to a grocer where he divides them into 5 pound and 10 pound bags. If the grocer uses the same number of 5 pound and 10 pound bags, how many bags of each did he use?
- 6) There are 12 matched pairs of socks in your drawer. There are three blue pairs, two brown pairs, 4 black pairs, and three white pairs. What is the probability of picking a brown pair of socks without looking? What are the odds **against** picking a brown pair?
- 7) A typical monitor today runs at 96 DPI, or dots per inch. However, this does not mean that there are 96 pixels in one square inch. It means it is a square that is 96 pixels by 96 pixels. How many pixels is that per square inch? How many pixels would be in a typical 15” by 12” monitor?
- 8) A pole that is 5 feet in height casts a 1-foot shadow. The Sears Tower in Chicago, Illinois is 1,454 feet tall. What is the length of its shadow? Assume the shadows are measured at the same time and location.
- 9) The Prism Company manufactures 3 different sizes of packing boxes; small, medium, and large. The small box has a length of 1 foot, a width of 3 feet and a height of 2 feet. The dimensions of the medium box are twice those of the small box. The dimensions of the large packing box are three times those of the small box. What is the ratio of the volumes of the three boxes?

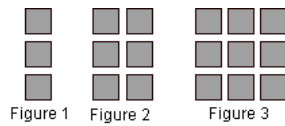
Show your work and/or explain your thinking for each problem.

- 10) A science museum is building three dimensional scale models of insects to display. They are using the scale  $25 \text{ cm} = 2.5 \text{ mm}$  actual insect. The model of a particular insect is 1 meter. How long is the insect in real life?

Show your work and/or explain your thinking for each problem.

### Set 21

- 1) The diagram below shows a sequence of figures made of square tile.



Use the diagram to complete the following:

- Sketch the next two figures in the sequence.
  - Make a list of ordered pairs  $(x, y)$  that represent the number of tile in the first six figures. Write the rule for the number of square tile used in any figure number. Use  $n$  to represent any figure number.
- 2) Mr. Bostic bought a used car for \$16,500. He had to pay an additional 15% for taxes and fees. What was his total cost for the car including the taxes, and fees?
- 3) The sum of consecutive odd integers always results in a square number. Given the pattern shown below, how many consecutive odd integers will it take to get a sum of 225?

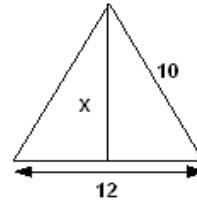
$$\begin{aligned}1 + 3 &= 4 \\1 + 3 + 5 &= 9 \\1 + 3 + 5 + 7 &= 16\end{aligned}$$

- 4) Mr. and Mrs. Santos want to have three children. What is the probability the will have at least two girls?
- 5) The numbers 1-30 are written on note cards and placed in a bag. Players randomly select a card. If the card drawn is a prime number, the player wins. If it is **not** prime, the player loses. What are the odds **against** the player winning?
- 6) The letters A, B, C, D, and E correspond to the points marked on the number line shown. Use the clues to match the point to the correct letter.  
A and E are both negative but E is smaller than A.  
B has no sign.  
C is greater than D.
- 
- 7) Sahara Taxi Service charges \$3.20 for the first mile and \$.50 for each additional mile or fraction of a mile. Ravi has \$25.00. What is the maximum number of miles he can go if he wants to leave the taxi driver a \$3.00 tip?
- 8) What is the sum of the interior angles of a dodecagon?
- 9) What is the probability of getting **exactly** three heads in three flips of a fair coin?
- 10) What is the probability of getting a sum of 11 or 4 when rolling two fair die?

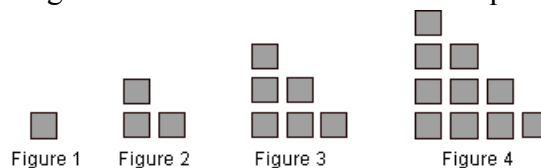
Show your work and/or explain your thinking for each problem.

### Set 22

- 1) Rafters support the roof of a house. Builders must cut the rafters to an exact size or buy them prefabricated (already made). Builders cut the lengths using the Pythagorean Theorem. What is the height of the rafter shown at right?



- 2) Windows are assigned a code number that corresponds to the width and then the height of the window. For example, a window with a code of 2846 has a width of 2'8" and a height of 4'6". What are the area and the perimeter of a 2846 window in feet?
- 3) Valerie's monthly electric bill last year was \$125. This year, her monthly electric bill is \$150. What is the percent of increase from last year to this year?
- 4) Julian's bill for lunch was \$15. He gave a \$3 tip. Erik's bill for lunch was \$12. He gave a \$2.50 tip. Who gave the higher percent tip?
- 5) A grocer sells potatoes in 4-pound bags and 3-pound bags. He sold 595 bags of potatoes on Thursday. He sold the same number of 4-pound bags as he did 3-pound bags. How many of each did he sell?
- 6) The cost of growing a tray of strawberry plants is \$.75 per tray. Write an algebraic expression that represents the total yearly cost ( $c$ ) to grow strawberry plants and ( $x$ ) is the number of trays grown. Use the equation you wrote to determine the number of trays of strawberry plants grown if the cost was \$1167.00.
- 7) Use the sequence of figures shown below to answer the questions.

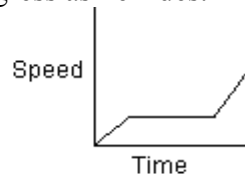
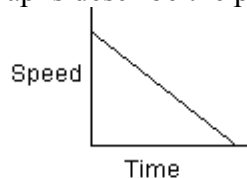
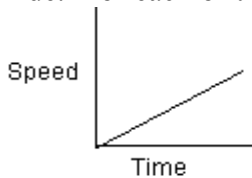


- If this pattern continues how many square tiles will it take to build the 10<sup>th</sup> figure?
  - Which figure number would use 78 square tiles? Explain.
- 8) The state of Nevada has an area of 286,367 square kilometers. In 2005, Nevada had an estimated population of 2,414,807 people. Approximately how many people per square kilometer is this?
- 9) 25.7% of the people in Nevada are under 18 years of age. Use the data from question 8 to determine the approximate number of people in Nevada who are under 18.
- 10) In the year 2000, the population of Nevada was 1,998,257. What was the approximate percent of increase from 2000 to 2005? Use the population data from question 8.

Show your work and/or explain your thinking for each problem.

### Set 23

- 1) Nine students shook hands with one another one and only one time. How many handshakes took place?
- 2) On the first day of school the math teacher had everyone shake hands with everyone else one and only one time. She said that 595 handshakes took place. How many students were there in the class?
- 3) A lock has a 3-digit combination. Each digit can range from 0-9. How many different 3-digit locker combinations are possible given that digits can be repeated?
- 4) The three graphs at right show the progress of a bicyclist at different times during a ride. For each of the graphs describe the progress as he rides.



- 5) A hot dog stand sells four different types of hot dogs, 7 different kinds of soda, and five different kinds of chips. How many different combinations of one hot dog, 1 soda, and one bag of chips are possible?
- 6) The table below shows the population of the state of Nevada from 1970 to 2020. All years after 2000 are estimates. Are the estimates reasonable? Justify your thinking.

Year	Population
1970	488,738
1980	800,508
1990	1,201,833
2000	1,998,257
2010	2,690,531
2020	3,452,283

- 7) 85% of the donations received by an organization go towards medical research. Last year \$45 million was donated to this organization. How much money went towards medical research?
- 8) Mary completed 22 out of 25 math problems. John completed 17 out of 20 math problems. Who completed the higher percent of problems?
- 9) The surface area of a certain cube is numerically equivalent to  $\frac{1}{4}$  of its volume. Find the length of the side of the cube.
- 10) How many diagonals does an 8-sided polygon have?

Show your work and/or explain your thinking for each problem.

### Set 24

- 1) The table shows the percent of change in population in three Nevada counties from 1990 to 2000.

County	Population in 2000	Percent Change from 1990
Churchill County	23,982	33.7
Clark County	1,375,765	85.5
Esmeralda County	971	-27.8

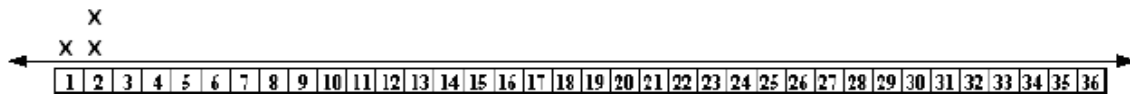
Use the population in 2000 and the percent of change to determine what the population was in 1990. Round your answer to the nearest whole person.

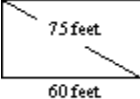
- 2) The Johnson family spent \$65 for dinner. They left a \$13 tip. What percent was the tip?
- 3) A salesperson at Appliance City is paid a weekly salary of \$200 plus an 8% commission on her total sales. Write an equation that represents the salesperson's total weekly income. Let (t) represent the salespersons total weekly income and (s) represents the total sales.
- 4) One week the salesperson at Appliance City had a paycheck of \$600. Use the equation you created in problem 3) to determine what her weekly sales was.
- 5) 85% of the donations received by an organization go towards medical research. Last year \$45 million was donated to this organization. How much money went towards medical research?
- 6) Terry completed 27 out of 35 passes in the last football game. What percent of his passes were complete? Round your answer to the nearest whole percent.
- 7) Whole milk contains 4% fat. What fraction of whole milk is fat? Express your answer in simplest form.
- 8) In a basketball game, Ronda scored 26 points for her team. Her team won the game with a total of 104 points. What percent of the team's points did Ronda make?
- 9) Sal looks in his closet and finds five shirts, 3 pair of pants, and three pairs of shoes. Sal wonders how many outfits he could make consisting of one shirt, one pair of pants and a pair of shoes. How many different outfits can Sal make?
- 10) In Mr. Rivera's 6<sup>th</sup> period science class  $\frac{3}{4}$  of the students are in the Desert Science Club. There are **at least** 18 students in the science club. How many students does Mr. Rivera have in his science class? Write and solve an inequality that represents the number of students Mr. Rivera has in his sixth period science class.

Show your work and/or explain your thinking for each problem.

### Set 25

- 1) The difference between two consecutive perfect squares is 47. What are the perfect squares?
- 2) The number 900 has exactly 18 factors. How many of the 18 factors are perfect squares?
- 3) The floor of a square room has an area of 289 square feet. How long is each side of the room?
- 4) Jessen and Paul are creating a Multiplication Game for the school carnival. Players will roll two number cubes and multiply. If the product of the two numbers is even the player loses. They are trying to determine the probability of getting an even number as the product of the two die. Complete the line plot below that shows all possible products when the two die are rolled. The first three products are indicated for you.



- 5) Use the line plot you created for problem 4) to answer the following questions.
  - a) How many possible outcomes are there when you roll the two number cubes and multiply?
  - b) What is the probability of getting a product of 6?
  - c) Which product is the most likely?
  - d) What is the probability that a player will get an odd product?
  - e) What are the odds in **favor** of getting an odd product?
- 6) A rectangular movie screen measures 60 feet across, and has a diagonal of 75 feet. How tall is the movie screen?
- 7) A square has an area of 64 square meters. How long is its diagonal? Leave your answer in radical form.
- 8) One right triangle measures 6, 8, and 10 feet. Another right triangle measures 6 and 8 feet, but is **not** congruent to the first. What is the length of the third side of the second triangle right triangle? Leave your answer in radical form.
- 9) You leave home and ride your bike 3 miles due east, then 4 miles due south to get to the store. You want to take a short cut home and decide to cut across diagonally from the store to your house. How many miles did you save by taking the shortcut?
- 10) Jim can paint three houses in five days. At this rate how long will it take to paint 10 houses?

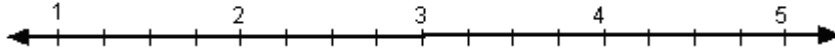


Show your work and/or explain your thinking for each problem.

### Set 26

- 1) Place the numbers in order from **least to greatest** on the number line shown.

$$3.5, 2\sqrt{3}, \sqrt{3}, 4, 2\frac{1}{4}, \frac{18}{5}$$



- 2) Police officers use the formula  $s = \sqrt{24d}$  to estimate the speed a car is traveling on dry pavement.  $S$  stands for speed and  $d$  is the length of the skid mark left by the car. A car left a skid mark that was 8 feet long. The car was traveling in a school zone with a speed limit of 15 mph. Was the car speeding? Explain your reasoning.

- 3) Another car left a skid mark that was 16 feet long. How much faster was the car going than the car in problem 1)?

- 4) The distance formula is used to determine the length of a line segment when the coordinates of its endpoints are known. The distance formula is shown below.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Use the distance formula to determine the length of a line segment whose endpoints are at (2, 7) and (5, 11).

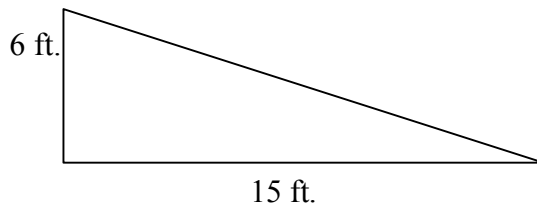
- 4) A store display window has boxes of shoes. Each of the rows has two fewer boxes than the row below it. The top row has four boxes. How many boxes will there be in the seventh row? How many pairs of shoes will there be if there is one pair in each box?

- 5) The coordinates of rectangle HIJK are H (2, 0), I (9, 0), J (9, 6), K (2, 6). Graph the rectangle and determine the length of its diagonals using the distance formula. Leave your answer in radical form.

- 6) What is the slope of the line shown in the chart?

<b>X</b>	2	9	16	23	30
<b>Y</b>	5	8	11	14	17

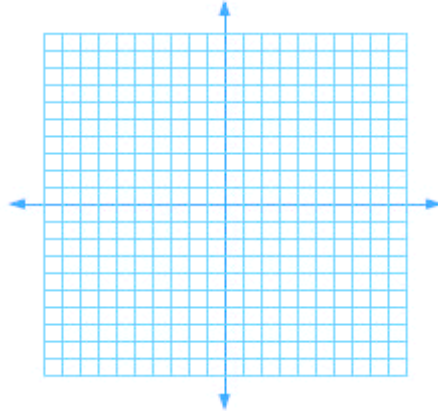
- 7) What is the slope of the ramp shown below?



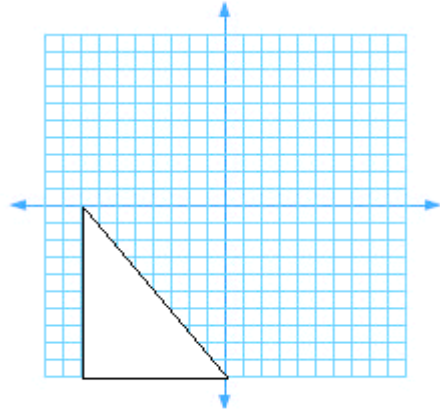
Show your work and/or explain your thinking for each problem.

**Set 26 continued**

- 8) On the coordinate plane shown graph the following ordered pairs.  $(-5, -3)$ ,  $(0, 0)$ ,  $(5, 3)$  then determine the slope of the line.



- 9) What are the side lengths and the area of the triangle shown? Round to the nearest hundredth where appropriate.

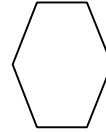


- 10) On Wednesday, August 8 it was announced that scientists had discovered a planet that is the largest currently known. It is 20 times larger than our Earth and has a diameter 1.7 times that of Jupiter. Jupiter, the largest planet in our solar system, has a diameter of 142,984 kilometers. How large is the diameter of the new planet?

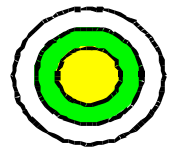
Show your work and/or explain your thinking for each problem.

**Set 27**

- 1) What is the sum of the interior angles of the figure shown?

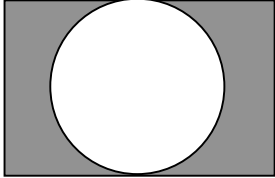


- 2) The interior angles of a quadrilateral measure  $2x$ ,  $4x$ ,  $6x$ , and  $8x$  degrees. Determine the number of degrees in each angle.
- 3) The diagram below shows a sequence of geometric figures. Figure 1 below has one angle. Figure 2 has three angles two small ones and a big one. How many angles are there in Figures 3 and 4? How many angles would there be altogether in Figure 8?
- 4) The formula for finding the sum of the interior angles of all polygons is  $n(n - 2)108^\circ = \text{sum of interior angles}$  where  $n$  represents the number of sides. Use the formula to determine the sum of the interior angles of an icosagon, a 20-sided polygon.
- 5) LaShawna created a dartboard for a school carnival. The radius of the smallest circle is 1 foot. The radius of the second largest circle is 2 feet and the radius of the entire dartboard is 3 feet. What is the probability that a dart will land in the white area? Express your answer in terms of  $\pi$ . Assume the dart hits the board somewhere.
- 6) The sum of the interior angles of a regular polygon is  $900^\circ$ . Determine the number of sides of the polygon and the measure of each interior angle.
- 7) The ratio of the angle measures of a triangle is 2:7:9. Determine the angle measures and then classify the angle based on side length and angle. Example: equilateral is a classification.
- 8) Mr. Mills has a clock that is in the shape of a regular octagon. Its perimeter is 132 cm. What is the length of each side of the clock face?
- 9) A dog is tied with a rope to a stake in the ground. The length of the rope is 5 yards. What is the area, in square yards, in which the dog can roam?
- 10) The perimeter of a triangle is 72 inches. The length of the first side is twice the length of the second side. The length of the third side is three times the length of the first side. Write and solve an equation that could be used to determine the side lengths of the triangle.



Show your work and/or explain your thinking for each problem.

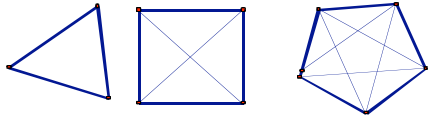
### Set 28

- 1) The We Surround You box company is designing a new box to hold smaller cube shaped boxes. The cubic boxes have a volume of 8 cubic inches. The large box has a top and a bottom that are each 64 square inches. The front and the back are each 48 square inches. The two sides are also 48 square inches. How many of the 8” cubic boxes will the larger box hold?
- 2) A quilted wall hanging is made of fabric cut into squares and trapezoids. There are 20 fabric trapezoids. Each has a base of four inches, another base of six inches, and a height of three inches. There are also 20 squares each has a side length of three inches. What is the total area of the quilt?
- 3) What is the length of one side of a square with an area of 169 square feet? What is the perimeter of the square
- 4) A children’s magazine stated that 99% of people, who try, can’t lick their own elbows and that 90% of the people who read that statistic try to do it. 1000 people are randomly selected people to read that statistic. How many people can we expect to be able to lick their own elbow?
- 5) Two angles are supplementary to one another. One angle has a measure that is 4 times the measure of the smaller angle. What is the measure of the larger angle? Write and solve an equation that could be used to answer this problem.
- 6) Ms. Jackson is planning to build a rectangular garden with a length of 20 ft and a width of 10 ft. In the center she wants a flower garden in the shape of a circle as shown. Ms. Jackson is going to fill the shaded part with rock. What percentage of the garden will be rock? Round your answer to the nearest percent.  

- 7) Jerry jogs around a circular track. The diameter of the track is 0.8 mile. If he runs twice around the track, how many miles will he complete? (use  $\pi = 3.14$ )
- 8) A rectangle has a length of 12 inches and a diagonal of 13 inches. What is the area of the rectangle?
- 9) A dog jumps through circular rings at a dog show. The dog needs the rings to have a width of at least 18 inches. Will a ring with a circumference of 39.8 inches be wide enough? (use  $\pi = 3.14$ )
- 10) I am thinking of a number. When the number is divided by 5 and then squared the result is 169. What is the number?

Show your work and/or explain your thinking for each problem.

**Set 29**

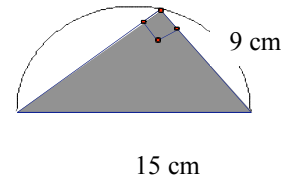
- 1) A square piece of carpet measures 18 inches on each side. A circular hole with a 6-inch diameter is cut into the carpet for a pipe. What is the area of the carpet, in square inches, after the hole has been cut? (use  $\pi=3.14$ )
- 2) A triangular YIELD sign measures 36 inches on each side. What is the area of the triangle? Round your answer to the nearest whole number.
- 3) Jeff and his wife Rebecca both work at night. Jeff is off every ninth evening. Rebecca is off every sixth evening. This Sunday is Jeff's day off. Rebecca is off the next day. When, if ever, will they be off the same evening?
- 4) A diagonal is defined as a line segment connecting non-adjacent vertices of a polygon. How many diagonals does a 15 sided polygon have? Use the diagram and complete the table below to help you solve this problem.



Number of sides	3	4	5	6	7	8	9	10
Number of diagonals	0	2	5					

- 5) Jae made a model of a pyramid for a project in math class. Part of the project requires him to determine the volume of the pyramid. The pyramid has a square base with an area of 144 inches. The height of the pyramid is 18 inches. What is its volume in cubic inches?

- 6) A right triangle is inscribed in semicircle as shown. The diameter  $AB$  is 15 cm, and the side  $CB$  is 9 cm. What is the area of the shaded region?



- 7) A circular swimming pool is four feet deep with a diameter of 22 feet. How many gallons of water, rounded to the nearest whole number, does the swimming pool hold? 1 cubic foot = 7.481 gallon
- 8) Ron's Rectangular Pizza Company has two pizza boxes that both have a volume of 512 cubic inches. One of the boxes measures  $16'' \times 16'' \times 2''$ . The other box measures  $16'' \times 8'' \times 4''$ . Which of the two boxes has the greater surface area? What is the difference between their surface areas?
- 9) Tennis balls are sold in a cylindrical can with three balls in each can. The diameter of each tennis ball is three inches. What is the minimum length of the can?
- 10) Mr. Abraham spent \$4800 for a used car. This amount was 15% of his annual income. What was his annual income?

Show your work and/or explain your thinking for each problem.

**Set 30**

- 1) Mr. Hanlon really likes ice cream so his wife gave him a paperweight in the shape of a cone. The base has a diameter of 16 cm and a height of 18 cm. What is the volume of the paperweight in cubic centimeters? (Use  $\pi = 3.14$ )
- 2) A building that is 60 feet tall casts a shadow that is 40 feet long. At the same time, and in the same location, Scott casts a four foot shadow. How tall is Scott?
- 3) A company is packing snack food in a cylindrical cardboard can. Each can is ten inches tall, with a diameter of four inches. How much cardboard would be needed to produce 5000 cylinder containers? (Use  $\pi = 3.14$ )
- 4) Anne borrows \$12,000 to remodel her home. The money is borrowed at 7% simple interest for three years. How much interest will Anne have to pay?
- 5) Given  $x$  is a whole number. What is the largest possible perimeter for a triangle with side lengths of 9, 10, and  $x$ ?
- 6) Australia has a personal income tax rate of 0% all the way up to 45%. Olivia lives in Australia and made \$62,000 last year. What are the minimum and the maximum amount of personal income tax that Olivia could pay on her earnings?
- 7) Russia has a personal income tax rate of 13%. How much personal income tax would Olivia have to pay on her income of \$62,000 if she lived in Russia instead of Australia?
- 8) The conductor of an orchestra stands on a platform. The platform is in the shape of a rectangular prism but does not have a bottom. The sides measure three feet by four feet. The height of the platform is 12 inches. What is the area of the surface of the platform? Express your answer in square feet.
- 9) How much will a quart of strawberries cost if four ounces cost \$.75?
- 10) Write and simplify an expression that would result in the reciprocal of  $(\frac{1}{3}x5)$ .

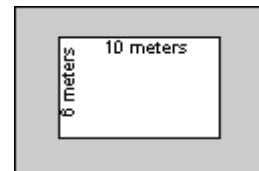
Show your work and/or explain your thinking for each problem.

**Set 31**

- 1) The volume of a rectangular prism is 3,072 cubic feet. The length of the base is twice the width of the base. The height is three times the width of the base. What are the dimensions of the prism?
- 2) The finishing times (in seconds) for the 100-meter dash at Mark's school track meet are as follows: 136, 152, 142, 148, 139, 137, 157, 139, 137, 135, 136, 152, 145, 144, 136, 150, 138, 147.  
Make a stem-and-leaf plot of the data. On the plot mark and label the minimum, maximum, median, and mode of the data.
- 3) The frequency table shows the ages of people attending a movie on a Saturday afternoon in July. Make a histogram of the data. Be sure to label your graph and include a title.

Age Group	Frequency
1-9	8
10-19	26
20-29	35
30-39	30
40-49	28
50-59	22
60-69	11
70 and over	6

- 4) Destiny cannot remember her locker combination. She knows the combination contains the numbers 12, 9, and 24 but she cannot remember the order of the numbers. How many different possible locker combinations are possible using those three numbers in any order?
- 5) How many different two-digit prime numbers can be created using the digits 1, 2, 3, 4, 5, and 6? Each of the digits may be used more than once.
- 6) A rectangular swimming pool measures 10 meters long by 6 meters wide. There is a concrete deck all the way around the edge of the pool as shown. The deck is the same width all the way around. It has an area of and has an area of 132 square meters, not including the pool. How wide is the deck?



- 7) One major pet food store recommends  $2\frac{1}{4}$  cups of dry dog food per day for a 25-pound dog. At this rate, how much is recommended for a 60-pound dog? Express your answer as a mixed number in simplest form.
- 8) The pet food store estimates the cost for the dry food for a 25-pound dog is \$.52. At this rate, how much will it cost to feed the dog for four weeks?

Show your work and/or explain your thinking for each problem.

9) Paul took four pictures of his dog to put in a frame. The frame only holds three pictures. How many ways could Paul choose three of the four pictures to put in the frame?

10) The heights, in inches, of Ms. Johnson's 8<sup>th</sup> grade science class are listed below.

Girls: 58, 62, 63, 60, 60, 58, 64, 55, 61, 62

Boys: 66, 64, 59, 61, 62, 61, 65, 58, 59, 63

Create a box and whisker plot for each set of data. Include a title and labels.

Make at least three observations about the data.



Show your work and/or explain your thinking for each problem.

### Set 32

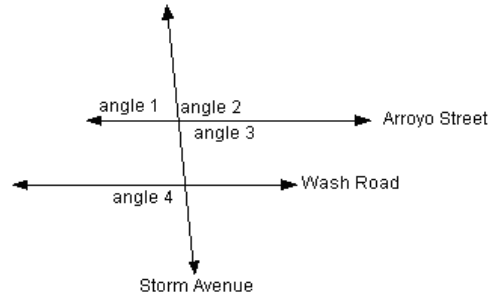
- 1) Micah borrowed money to buy a used motorcycle. He borrowed the money at 8% simple interest for two years. Micah had to pay \$756 in interest at the end of the two years. How much money did Micah borrow?
- 2) Becky and Tara are trying to decide what to put on their ice cream sundaes. There are four types of sauce, three types of candy sprinkles, and two types of nuts from which to choose. They can also have whipped cream or leave it off. How many different types of sundae could they order with **only one** kind of sauce, one type of nut, and a choice of whipped cream or no whipped cream?
- 3) Lightning heats the air, which causes it to expand quickly. The air expanding is what causes the sound of thunder. Sound travels at approximately one mile in five seconds. How long will it take thunder to travel 12 miles?
- 4) Gianna saw a lightning bolt and then heard the thunder six seconds later. How far away was the lightning strike?
- 5) Ms. Wong's class is building a scale model of a town. A 3-inch scale model truck represents an 18-foot truck. Using the same scale how tall would the scale model of a 54-foot building be?
- 6) Blake made \$42,000 last year. This year he earned \$48,000. What percent is the increase in salary? Round your answer to the nearest whole percent.
- 7) Damian, Pete, and Alejandro are married to Cora, Jill, and Anita but not necessarily in that order. They are all members of the same golf club. Use the clues below to determine what the name of each man's wife is?  
In the club's golf tournament,
  - a) Damian's wife and Jill's husband play golf against Cora and Anita's husband.
  - b) No husband and wife play as partners.
  - c) Pete, who is a tennis player, does not play golf.
- 8) My license plate has a three-digit number. The product of the three digits is 216 and their sum is 20. The digits appear in ascending order. What is my license-plate number?
- 9) After a committee meeting where ten people sat around a circular table, each person shook hands with everyone else except the people who sat on either side. How many handshakes took place?
- 10) If the perimeter and area of a square are equal, what is the length of its diagonal? Leave your answer in radical form.

Show your work and/or explain your thinking for each problem.

### Set 33

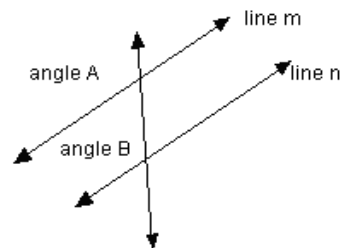
- 1) The measure of an angle is 12 degrees more than its complement. What are the measures of the angles? Write and solve an equation that could be used to answer the question
- 2) Two supplementary angles are in the ratio of 2:3. Write and solve an equation that could be used to determine the measure of each angle.

- 3) Arroyo Street and Wash Road are parallel to one another. The two streets are intersected by Storm Avenue as shown. In the diagram, the measure of angle 1 is  $85^\circ$ . What is the measure of the other three angles? Justify your answers.  
**Note:** the diagram is **not** drawn to scale.



- 4) Soccer balls come in four sizes. The size depends on the age of the players using the ball. The sizes are as follows:
  - Size 5 is the international standard match ball for all ages 12 and older, including all adult play ,
  - Size 4 is recommended for players ages 8 and 12 years,
  - Size 3 is recommended for players under 8 years,
  - Size 2 and 1 are promotional soccer balls.A size 5 soccer ball has a maximum diameter of 28 inches. What is the surface area of a Size 5 soccer ball with a circumference of 28 inches? The formula for surface area of a sphere is  $4\pi r^2$  where  $r$  is the radius. Use  $\pi = 3.14$  and round your **final** answer to the nearest tenth of an inch.
- 5) The Size 4 soccer ball has a maximum circumference of 26 inches. What is the difference between the surface area of the Size 5 soccer ball and the Size 4 soccer ball? The formula for surface area of a sphere is  $4\pi r^2$  where  $r$  is the radius. Use  $\pi = 3.14$  and round your **final** answer to the nearest tenth of an inch.

- 6) In the diagram angle A is  $116^\circ$  and angle B is equal to  $3x - 16^\circ$ . Determine the value of  $x$  that makes line m and line n parallel. Show all work.



Show your work and/or explain your thinking for each problem.

**Set 33 continued**

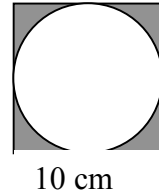
- 7) A long distance telephone company charges \$.90 for the first minute of a phone call and \$.07 for each additional minute. Darren made a phone call that cost him \$1.95. Write and solve an equation that could be used to determine the number of minutes he talked. Use **m** for minutes and **c** for total cost.
- 8) Chidima is buying a car for \$12,000. If she finances the car through the dealership her car payments will be \$254 per month for 5 years. How much money would she save by paying \$12,000 in cash for the car instead of making payments?
- 9) At the beginning of the year, the odometer (mileage gauge) on Scott's car read 25,124 miles. At the end of the year, it read 37,364 miles. Scott's car averages 24 miles per gallon. Approximately how many gallons of gasoline did he use during the year?
- 10) In an election, the winning candidate had 1600 more votes than the loser did. The total number of votes cast was 15000, how many votes did the winner receive? Write and solve an equation that could be used to answer this question.

Show your work and/or explain your thinking for each problem.

**Set 34**

- 1) What is the sum, in degrees, of the measures of the interior angles of a pentagon?
- 2) Two distinct integers are selected from the set of numbers:  $\{-2, -1, 0, 1, 2\}$ . What is the probability that their sum is larger than their product. Express your answer as a fraction in simplest form.
- 3) On a coordinate grid, draw  $\triangle LMN$  using the given coordinates.  
 $L(1, -2), M(4, -1), N(2, 3)$  Then rotate  $\triangle LMN$   $90^\circ$  clockwise about the origin.  
 Name the coordinates of the transformed figure.

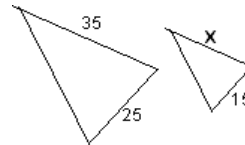
- 4) A circle is inscribed in a square with a side length of 10 cm as shown. Determine the area of the shaded region. (Use  $\pi = 3.14$ )



- 5) The maximum diameter of a regulation NBA basketball is 29 inches. What is the maximum volume of a regulation NBA basketball? The formula for volume of a sphere is  $V = \frac{4}{3}\pi r^3$ . Use  $\pi = 3.14$  and round your **final** answer to the nearest tenth of an inch.

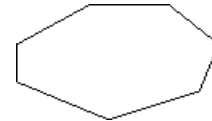
- 6) What fraction is  $\frac{1}{3}$  of the way from  $\frac{1}{4}$  to  $\frac{1}{2}$ ?

- 7) The triangles shown right are similar. What is the value of  $x$ ?



- 8) Two fair die are tossed. What is the probability that their sum is two **or** 12? Express your answer as a fraction in simplest form.

- 9) What is the sum of the interior angles of the figure shown at right?



- 10) Natasha created a circular spinner for math class. The spinner has four sections and each section has a different point value. The central angle measurements for each of the four sections are listed below.

Central angle measure	$20^\circ$	$80^\circ$	$160^\circ$	$100^\circ$
Colors	Yellow	Red	Green	Blue
Probability of spinning				

What is the probability that the spinner will land in each of the sections? Complete the table. Express your answer as a fraction in simplest form.

Show your work and/or explain your thinking for each problem.

### Set 35 Review

- 1) Sandy is on the first store of a 15-story office building. Each story of the building is the same height and the floors are numbered 1 through 15. A climb to the 6<sup>th</sup> floor is what fraction of a climb to the 10<sup>th</sup> floor? Express your answer as a fraction in simplest form.
- 2) A package of snack mix contains raisins and peanuts. It contains three pounds of peanuts that cost \$2.50 a pound and two pounds of raisins that cost \$2.00 a pound. How much should the package of snack mix cost?
- 3)  $\triangle LMN$  is an equilateral triangle with a side length of 250 inches. Its perimeter is 50 times the perimeter of another equilateral triangle,  $\triangle STU$ . What is the side length of  $\triangle STU$ ?
- 4) Scotty is driving at an average speed of 70 miles per hour. At this rate, how many miles does he travel in 1 hour and 45 minutes?
- 5) Line segment PQ has endpoints at (5, 3) and (-6, -5). How long is the line segment? Leave your answer in radical form.
- 6) Terry bought cookies for her friends. First Logan ate  $\frac{1}{3}$  of the cookies. Then Marissa ate  $\frac{1}{4}$  of the remaining cookies. Finally, Angel ate  $\frac{1}{2}$  of what was left. After they were finished, there were three cookies left for Terry. How many cookies did Terry buy?
- 7) Caleb and Jordan went shopping together. Caleb bought twelve CD's for \$132. Jordan bought four posters and three CD's for \$85. They made their purchases at the same store. There were no discounts and the CD's were all the same price. How much did the four posters cost?
- 8) The difference of two cubes is 513. What are the two cubes?
- 9) A rectangular prism has a volume of 288 cubic inches. The length is  $\frac{1}{2}$  the width. The height is  $\frac{1}{3}$  the width. What are the dimensions of the prism?
- 10) A triangular prism has a height of 15 centimeters. The triangular base has a base area of 25 square centimeters. What is the volume of the triangular prism? The formula for volume of a triangular prism is  $\frac{1}{3} \text{base area} \times \text{height} = v$ .

Show your work and/or explain your thinking for each problem.

### Set 36 Review

- 1) Mr. Nelson burns 1176 calories riding his bicycle for 120 minutes. At the same level of exertion, how many calories can he expect to burn riding for 40 minutes?
- 2) Candis orders two large pizzas and two orders of chicken wings during a football game. The food cost \$19.95, which does **not** include tax and a tip. The tax rate is 7% and she plans on tipping 15%. What will her total bill be? Round your answer to the nearest penny.
- 3) Juanita is 1250 miles from home. She is driving at an average speed of 65 miles per hour. How far from home will she be after driving for six hours at an average speed of 65 miles per hour?
- 4) Find two consecutive odd integers whose sum is 132 and whose product is 4,355.
- 5) Mason cuts a rope into three pieces. The first piece is twice as long as the second piece. The third piece is  $\frac{1}{2}$  the length of the second piece. The rope is 105 feet long. How long is each piece? Write and solve an equation that could be used to answer this question.
- 6) The locker combination for your bike has three numbers. The numbers are from zero to ten. How many different locker combinations are there if the numbers can only be used once?
- 7) Don received a 6% commission for selling \$1200 in electronics. Gene received an 9% commission for selling \$900 worth of electronics. Who made the most money?
- 8) Cameron burns 675 calories by jogging for 45 minutes. At this rate, how many minutes would it take to burn 1500 calories.
- 9) Bria invested \$2000 in the stock market... During the first year the value of her stock had increased by 15%. At the end of the second year, the value had decreased by 15% in comparison to the first year. What is the value of Bria's shares after two years
- 10) Ms. Milk is comparing two sets of data. The first set of data has 20 values with a mean of 50. The second set of data has 33 values with a mean of 75. What is the mean of the two sets of data combined? Round your answer to the nearest whole number.