Summer Math Packet

Manchester Public Schools

Given to Seventh Graders in June Going into Eighth Grade

2017

Name: _____

School: _____

Grade 7- CCSS Math Summer Packet

The Number System

1. You have $6 and you need to pay a friend $4. What will you have after paying your friend?

2. Your cell phone bill is automatically deducting $56 from your bank account every month. How much will the deductions total for the year?

3. Solve the subtraction problem below.

   -4 – 2

   Show or explain how you found your answer. You may use the number line to help you.
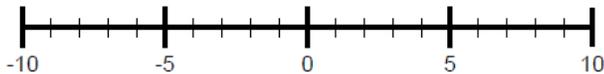
4. Look at the subtraction problem below.

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

   Write an addition problem that is equivalent to this subtraction problem.

   Show or explain how you know your addition problem is equivalent to $\frac{1}{3} - \frac{4}{6} = -\frac{1}{3}$.

5. On June 8, Kayla's bank account balance was -$160. What was the amount of the withdrawal for check #120 that caused this negative balance?

|	Transaction	Withdrawals (-)	Deposits (+)	Balance
June 3	Deposit		$65	$100
June 8	Check #120	?		- $160

6. What is the decimal form of $\frac{5}{8}$? Show or explain how you found your answer.

7. Multiply $\frac{3}{2} \bullet \left[-\frac{1}{5} \right]$

8. Divide $\frac{5}{2} \div \left[-\frac{3}{4} \right]$

9. On Thursday, the temperature changed -3°F per hour from 5:00 p.m. until 11:00 p.m. By how many degrees Fahrenheit (°F) did the temperature change during this time period? Show or explain how you found your answer.

10. A submarine descended 160 feet from the surface of the water in 40 seconds. What was the rate of the descent in feet/second? Show or explain how you found your answer.

11. Mrs. Smith is buying two toys. The original costs for each toy are $8 and $10. The toys are on sale for ¼ off. Mrs. Smith wrote the expression ¼ (8 + 10) to find the discount on both toys. Write another expression, using the numbers in the problem, that that can be used to find the discount on both toys. Show or explain why the expression is the same as Mrs. Smiths' expression.

12. Jaquan wants to place a picture frame in the center of a wall that is $12\frac{3}{4}$ feet wide. The picture is 3 ½ feet wide. How many feet from each side of the wall will the frame be? Show or explain how you found your answer.

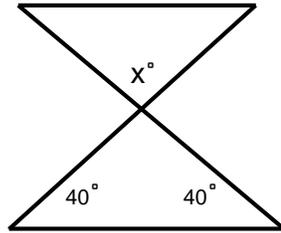3 ½ ft.

12 ¾ ft.
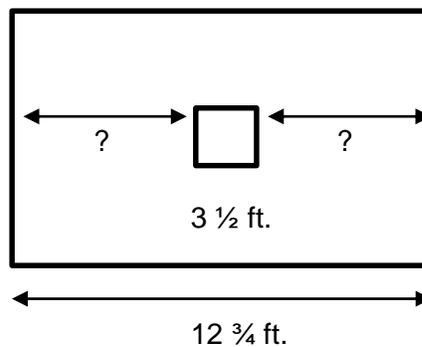
Geometry

13. Write and solve an equation to find the measure of angle *x*
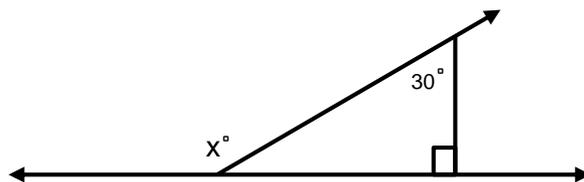
14.   Write and solve an equation to find the measure of angle *x*.

15.   Is it possible to draw a triangle with a 90˚ angle and one leg that is 8 centimeters long and one leg that is 6 centimeters long? Is there more than one such triangle that exists with these conditions?

16.   If you drew a triangle with angles that are all 60 degrees, would this triangle be unique? Why or why not?

17.   If you drew an isosceles triangle with only one 80 degree angle, would there only be one possibility or can other triangles be drawn to meet these conditions?

18.   Draw a quadrilateral with one set of parallel sides and no right angles. What is the precise name for this quadrilateral?

19.   Find a rectangular prism in your home. Determine the objects' volume and surface area.

      a.   State the object you are using for your rectangular prism.

      b.   State the dimensions of your rectangular prism.

      c.   Show your calculations for the volume of the rectangular prism.

      d.   Show your calculations for the surface area of the rectangular prism.
           (Hint: Create a net of the object and use the net to calculate the surface area.)

20.   Find the area of a triangle with a base length of ten units and a height of six units.

21.   Find the area of the trapezoid shown below using the formulas for rectangles and
       triangles.

6 cm

10 cm

14 cm
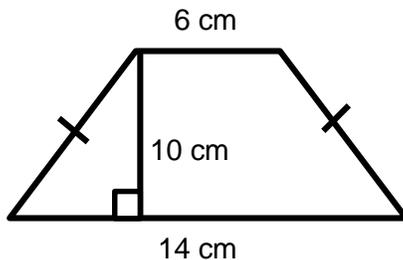
22.   Write a step-by-step procedure for determining the area of the figure below.
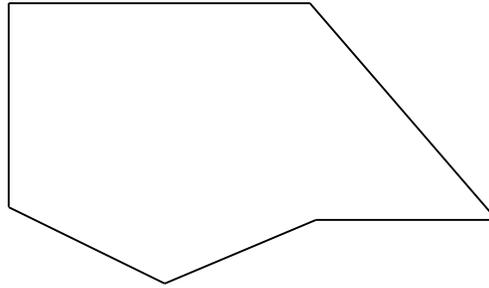
23.   Measure the circumference and diameter of three circular objects in your home (clock, trash can, door knob, wheel, etc.). Organize your information and discover the relationship between circumference and diameter by noticing the pattern in the ratio of the measures.

Object	Circumference	Diameter	Ratio

Write an expression that could be used to find the circumference of a circle with any diameter and check your expression on two other circles.

24.   The students in Mrs. Ferreira's art class are designing a stained-glass window to hang in the school entryway. The window will be 2 feet tall and 5 feet wide. They have drawn the design below:
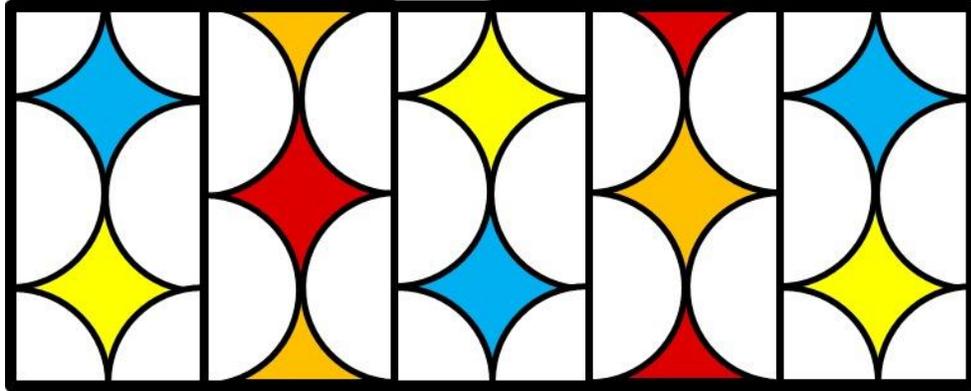

They have raised $90 for the materials for the project. The colored glass costs $4 per square foot and the clear glass costs $2 per square foot. The materials they need to join the pieces of glass together costs 20 cents per foot and the frame costs $3 per foot.

Do they have enough money to cover the costs of the materials they will need to make the window?

25.   Describe the shapes that are created when planar cuts are made diagonally, perpendicularly, and parallel to the base of a rectangular prism.
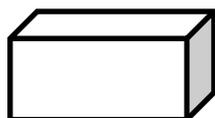
26. Jack showed you the scale drawing of his room. If each 1 cm on the scale drawing equals 3 ft, what are the actual dimensions of Jack's room? Reproduce the drawing at 2 times its current size.

4.6 cm

1.1 cm

3 cm

1.1 cm

1.9 cm

3.5 cm
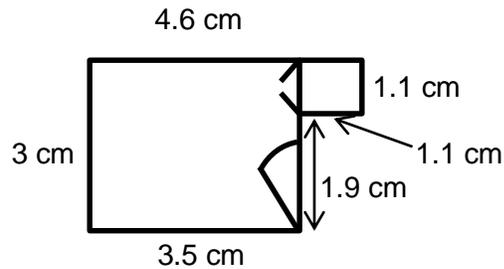
Ratios and Proportional Relationships

27. A student is making Chex mix. Create a graph to determine if the quantities of Chex and pretzels are proportional for each serving size listed in the table. If the quantities are proportional, what is the constant of proportionality or unit rate that defines the relationship? Explain how you determined the constant of proportionality and how it relates to both the table and graph.

Serving Size	1	2	3	4
Cups of Chex (x)	1	2	3	4
Cups of Pretzel (y)	2	4	6	8
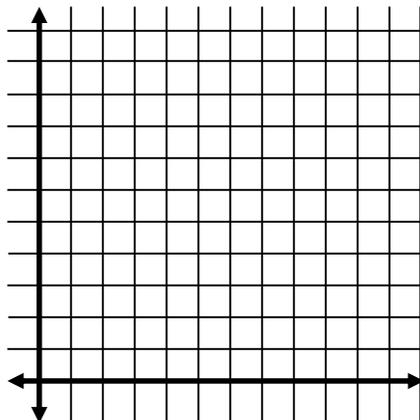
28.   The graph below represents the cost of a package of Starbursts as a unit rate of $2 dollars per package of Starbursts. The unit rate is represented as $2/pack. Represent the relationship using a table and an equation.
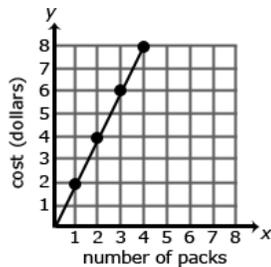
29.   Gas prices are projected to increase 115% by June 2014. A gallon of gas currently costs $3.89. What is the projected cost of a gallon of gas for June 2014?

30.   A hoodie sweatshirt is marked down 30%. Its original price was $39.50. What is the price of the sweatshirt before sales tax?

31.   A t-shirt is on sale for 40% off. The sale price is $27.50. What was the original price of the shirt? What was the amount of the discount?

32.   At an electronic store, 54 flat screen television sets were sold in March. The manager at the store wants to encourage the sales team to sell more TVs and is going to give all the sales team members a bonus if the number of TVs sold increases by 40% in April. How many TVs must the sales team sell in April to receive the bonus? Justify your solution.

33.   A car salesperson set a goal to earn $3,000 in May. He receives a base salary of $600 as well as a 15% commission for all sales. How much merchandise will he have to sell to meet his goal?

34.   After eating at a restaurant, your bill before tax is $34.78. The sales tax rate is 6.25%. You decide to leave a 18% tip for the waiter based on the pre-tax amount. How much is the tip you leave for the waiter? How much will the total bill be, including tax and tip? Express your solution as a multiple of the bill.

Expressions and Equations

35.   Jamie had $25 dollars to spend on school supplies. After buying 9 pencils, he had $13.30 left. How much did each pencil cost?

36.   The sum of three consecutive odd numbers is 51. What is the smallest of these numbers?

37.   Solve: $\frac{3}{4}x + 5 = 20$

38.   Enza has at most $100 to spend on clothes. She wants to buy a pair of jeans for $49 dollars and spend the rest on t-shirts. Each t-shirt costs $19. Write an inequality for the number of t-shirts she can purchase.

39.   Noah has $20 dollars. He spent $10.61, including tax, to buy a new CD. He needs to set aside $8.00 to pay for his lunch next week. If gum cost $0.89 per package including tax, what is the maximum number of packages of gum that Noah can buy?

Write an equation or inequality to model the situation. Explain how you determined whether to write an equation or inequality and the properties of the real number system that you used to find a solution.

40.   Solve $\frac{1}{4}x + 2 > 3$ and graph your solution on a number line.

41.   Write an equivalent expression for $4(x + 3) - 5$

42. Derek thinks the two expressions $3(2a - 4)$ and $6a - 4$ are equivalent? Is he correct? Explain why or why not?

43. Write an equivalent expression for $2a + 10$.

44. A rectangle is three times as long as wide. One way to write an expression to find the perimeter would be $w + w + 3w + 3w$. Write the expression in two other ways.

45. An equilateral triangle has a perimeter of $3x + 12$. What is the length of each of the sides of the triangle?

46. Gabriella and Danny both get paid an equal hourly wage of $8 per hour. This week, Danny made an additional $32 dollars in overtime. Write an expression that represents the total weekly wages of both, if G = the number of hours that Gabriella worked this week and D = the number of hours Danny worked this week? Can you write the expression in another way?

Statistics and Probability

47.   The school food service wants to increase the number of students who eat breakfast in the cafeteria. The student government has been asked to conduct a survey of the student body to determine the students' preferences for breakfast. They have determined two ways to do the survey. The two methods are listed below. Identify the type of sampling used in each survey option. Which survey option should the student government use and why?

        1. Survey the first 30 students that enter the school.
        2. Write all of the students' names on cards and pull them out in a draw to determine who will complete the survey.

48.   Below is the data collected from two random samples of 100 students regarding student's school lunch preferences. Make two inferences based on the results.

Lunch Preferences

Student Samples	Chicken Nuggets	Nachos	Pasta and Meat Sauce	Total
#1	18	28	54	100
#2	17	32	51	100

49. The two data sets below depict random samples of the housing prices sold in the Newington and Middletown in Connecticut. Based on the prices below which measure of center will provide the most accurate estimation of housing prices in Connecticut? Explain your reasoning.

> Newington {1.2 million, 242,000, 265500, 140000, 281000, 265000, 211000}

> Middletown {1.1million, 154000, 250000, 250000, 200000, 160000, 190000}

50. Jamar wanted to compare the mean height of the players on his favorite football and basketball teams. He thinks the mean height of the players on the basketball team will be greater but doesn't know how much greater. He also wonders if the variability of heights of the athletes is related to the sport they play. He thinks that there will be a greater variability in the heights of football players as compared to basketball players. He used the rosters and player statistics from the team websites to generate the following lists.

> Basketball Team – Height of Players in inches for 2011-2012 Season

> 75, 73, 76, 78, 79, 78, 79, 81, 80, 82, 81, 84, 82, 84, 80, 84

> Football Team – Height of Players in inches for 2011

> 73, 73, 73, 72, 69, 76, 72, 73, 74, 70, 65, 71, 74, 76, 70, 72, 71, 74, 71, 74, 73, 67, 70, 72, 69, 78, 73, 76, 69

To decide whether Jamar's conclusions are accurate - create two dot plots on the same scale. Find the mean and mean absolute deviation of each data set. Use these calculations to justify your answer.

51.   If you choose a point in the square, what is the probability that it is NOT in the circle?

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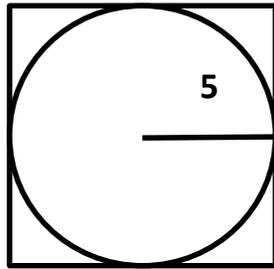
52.   A container contains 3 red, 2 green, and 4 blue marbles. Without looking, if you choose a marble from the container, will the probability be closer to 0 or to 1 that you will select a red marble? A green marble? A blue marble? Justify each of your predictions.

53.   Show all possible arrangements of the letters in the word MATH using a tree diagram. If each of the letters is on a tile and drawn at random, what is the probability that you will draw the letters M-A-T-H in that order? What is the probability that your "word" will have a T as the first letter.