Name _____ Period _____ Date _____

6-7 NONROUTINE PROBLEMS
CHOOSING A CAR

Jerry is going to borrow a vehicle from a family member. He has to pay for gas, so he wants to choose the car with the best gas mileage to travel to and from school 5 days per week. His school is 25 miles from his home. The car choices are below.

1. Jerry's grandfather said he could borrow his old compact car. His grandfather just took a trip to the beach and used about half the gas tank capacity. The round trip was 207 miles.

   a. If the tank can hold 18 gallons of gas, how many gallons did Grandpa use?

   b. How many miles per gallon did the car get?

   c. Jerry's grandfather paid $3.75 per gallon. How much did he pay for his beach trip?

   d. How much gas (in gallons) will Jerry need daily for school using this car?

2. His mother said Jerry could use her old truck. It goes 525 miles on a tank of gas, and the tank has a capacity of 21 gallons.

   a. How many miles per gallon does the truck get?

   b. Jerry's mom filled the gas tank for $71.40. What is the current price of gas (per gallon)?

   c. How much gas (in gallons) will Jerry use daily for school using this truck?

Name _____ Period _____ Date _____

6-7 NONROUTINE PROBLEMS
CHOOSING A CAR
Continued

3. Jerry's older sister said he can use her van to get to school. She said the van goes about 400 miles on a tank of gas. The van's gas tank holds 25 gallons of gas.

   a. How many miles per gallon does the van get?

   b. Jerry's sister said she bought a tank of gas the other day for $81.25. How much did she pay per gallon?

   c. How much gas (in gallons) will Jerry use daily for school with this van?

4. Based on the information above, which vehicle should Jerry use to go to school? Explain.

Name _____ Period _____ Date _____

6-7 NONROUTINE PROBLEMS
OPEN MIDDLE RATIO CHALLENGE

- Use the digits 1 – 9 at most once each to fill in the 9 missing cells on the entire page.
- Each table should contain equivalent ratios for each pair of entries in that table.
- Write column headings to make sense of each table's values, and explain the context.

1.

6	
10	15
12	18

Context represented by the table:

2.

14	10
28	20
42	30

Context represented by the table:

3.

		5	3		2
		20	12	24	

Context represented by the table:

Name _____ Period _____ Date _____

6-7 NONROUTINE PROBLEMS
ANIMALS CARD SORT

How much do some animals eat? What other fun facts might we learn? Your teacher will give you some cards to sort about animals. Work with one or more partners.

Cut out the cards. Identify the four animals and match cards to statements, tables, and fun facts about them.

Let *d* represent the number of days.
Let *f* represent an amount of food eaten per day.

1. Fill in the five columns of the chart. (Write card letters in columns II, III, and IV.) Equations in Column V are in the form *f* = _____.

I	II	III	IV	V
Name of Animal	**Table**	**Unit Rate (per day)**	**Fun Fact**	**Equation**
Card A:				
Card B:				
Card C:				
Card D:				

2. Go to Desmos.com (https://www.desmos.com/calculator) and graph each of your equations above using the Desmos Graphing Calculator.

   Answer the following using the graphs.

   a. Why is it difficult to see all of the graphs at one time?

   b. Which animal's graph is the steepest line? Why is this true?

   c. What does the point (0,0) represent for each animal?

   d. The graph of which animal intersects the point (3,180)? What does this ordered pair represent for this animal?

Name _____ Period _____ Date _____

6-7 NONROUTINE PROBLEMS
WHAT'S MY RULE?

Some students in Mrs. Lovelace's math class were creating input/output tables but didn't finish. For each table:

- Determine the pattern started and complete the table.
- Fill in one more input/output of your choice at the bottom of the table.
- Write the rule in words for all problems describing the inputs and outputs; also write the rule in symbols for problems 3 and 4.

1.

Input	Output
math	4
pattern	
equation	8
dependent	
independent	11

Rule:

2.

Input	Output
finding	
patterns	q
is	j
really	
neat	o

Rule:

3.

Input (x)	Output (y)
2	1
8	
12	6
7	3.5
	2.25

Rule:

4.

Input (x)	Output (y)
3	1
12	4
	5
30	10
1	

Rule:

Name _____ Period _____ Date _____

6-7 NONROUTINE PROBLEMS
MIXED PROBLEMS

1. The table to the right shows the speed of the T-shirt launchers at a hockey game. Who launched the most T-shirts per minute?

   a. Amir b. Betto

   c. Chuck d. Danisha

T-shirt Launcher	Number of Shirts Launched	Time (Minutes)
Amir	50	10
Betto	54	12
Chuck	22	5
Danisha	42	8

2. The table below shows the relationship between the number of gallons of gas purchased and its price at a gas station. Fill in the missing values to complete the table.

Price ($)		16			32
Amount of gas (gal)	1	5	7	9	

3. At the local zoo the caretakers cut and prepare 1,200 pounds of bamboo for the pandas each week. At this rate, select all of the following that must also be true.

   a. The amount of bamboo for a month (4 weeks) is 4,800 pounds.

   b. The amount of bamboo for a day is about 171 pounds.

   c. The amount of bamboo for a day is about 240 pounds.

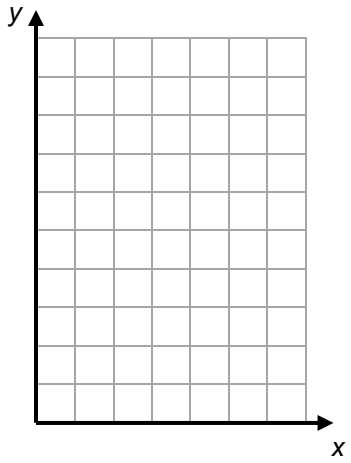
   d. The amount of bamboo for a year is about 14,400 pounds.

4. Jerome biked 16 miles in 4 hours. Susan biked 18 miles in 6 hours. Both biked at constant rates of speed.

   a. Represent each person's trip with a graph.

   b. How far did each person go in 1 hour?

   c. What about the lines graphed suggest that they are not going at the same speed?



Name _____ Period _____ Date _____

6-7 NONROUTINE PROBLEMS
MIXED PROBLEMS
Continued

5. Kris is buying pinto beans. She went to the store and found three options.

   a. The dry pinto beans cost $1.80 and serves 12. How much is the cost per serving?

   b. The national-brand canned pinto beans cost $1.80 and serves 4. How much is the cost per serving?

   c. The store-brand canned pinto beans cost $1.20 and serves 4. How much is the cost per serving?

   d. What is the same and what is different about part a and part b?

   e. What is the same and what is different about part b and part c?

   f. Which type of pinto beans are the cheapest? Explain.

6. An ostrich can run 21 miles in 30 minutes.

   a. Knowing ostriches can keep their pace over enormous distances, how long would it take an ostrich to run 31.5 miles?

   b. At this rate, how far could an ostrich run in 2 hours?

7. A store sells 4 avocados for $5. Based on this rate, which of the following statements are true?

   a. The cost of an avocado is $0.80.

   b. Each avocado is $1.25.

   c. The amount of avocado for $1 is 0.8 lb.

   d. The amount of avocado for $1 is 1.25 lbs.

Name _____ Period _____ Date _____

6-7 NONROUTINE PROBLEMS
MIXED PROBLEMS
Continued

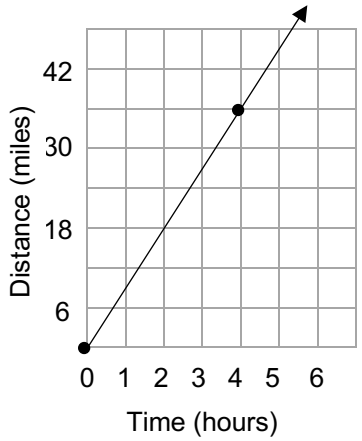
8. A local vendor at the Farmer's Market sells peaches for $9 per 3 pounds.

   a. How much are the peaches per pound?

   b. If the average peach weighs 5 ounces, how many peaches can you get per pound? (There are 16 ounces in a pound.)

   c. About how much will each peach cost?

9. This graph shows the relationship between the number of miles Jesse rode his bike and the amount of time elapsed.



   a. What does (0,0) represent in this situation?

   b. How many miles does Jesse travel per hour? Explain.

   c. How far does Jesse travel in 6 hours?

10. The table below shows the relationship between the number of burgers and the number of hot dogs sold from a food truck. Fill in the missing values if the ratio of burgers to hotdogs remains constant. Then select all of the statements below that are true.

Burgers		5	10		15	
Hot Dogs	10	2		8		12

   a. More hot dogs than burgers were sold.

   b. More burgers than hot dogs were sold.

   c. For every 100 hot dogs sold, there were 40 burgers sold.

   d. For every 100 burgers sold, there were 40 hot dogs sold.

   e. For every burger sold, there were 2.5 hot dogs sold.

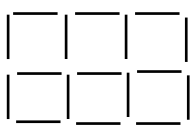
Name _____ Period _____ Date _____

6-7 NONROUTINE PROBLEMS FROM THE MATH OLYMPIAD

1. A group consists of 2 girls for every boy. Later, 24 more girls joined the group. There are now 5 girls for every boy. How many boys are in the group?

2. Bryan can buy cookies at a rate of 4 for 50 cents and can sell them at a rate of 3 for 50 cents. How many cookies must Bryan sell in order to make a profit of $5.00?

3. In the diagram below, 17 toothpicks are used to form a 2-square by 3-square rectangle. How many toothpicks would be needed to form a 6-square by 8-square rectangle?



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