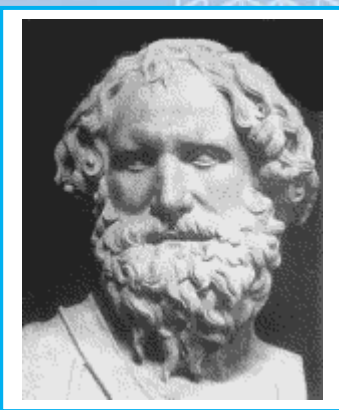Pythagoras

Archimedes

Euclid

A
MATHEMATICS
Winter Number Land

ANSWER KEY/SOLUTIONS

Grade 10

Winter 2011-2012

Miami-Dade County Public Schools
Curriculum & Instruction

TABLE OF CONTENTS

WELCOME TO *A MATHEMATICS WINTER NUMBER LAND*

The realm of mathematics contains some of the greatest ides of humankind. A Mathematics *Winter Number Land* activities included in this packet are a mathematical excursion designed to be read, fun to do, and fun to think and talk about. These activities will assist you in applying the concepts you have studied. Additionally, each activity addresses a specific Sunshine State Benchmark. Each benchmark is listed at the end of the activity.

The journey to true mathematics understanding can be difficult and challenging but be patient and stay the course. Mathematics involves profound ideas. As we make these ideas our own, they will empower us with strength, techniques, and the confidence to accomplish wonderful things. Enjoy working each activity.

Included as part of this packet, is a link to the Miami-Dade County Public Schools Student Portal *Links to Learning* technology activities.   Individualized student learning paths have been designed based on FCAT/EOC scores and are aligned to the District's Pacing Guides. These online activities are supplemental and, as such, are not to be assigned or graded. All online activities are provided as a resource to both parents and students to engage learning using technology. Please log on just as you do at your school.

If you are in need of additional information about the *Walking in a Winter Number Land* Winter Break Activity Packet, please contact the Division of Mathematics, Science, and Advanced Academic Programs, at 305 995-1939.

Tips for Walking in a Winter Number Land

Read the activity and attempt to answer the questions that follow. The only rules are:
1. Make an earnest attempt to solve the problem. Record your attempts.
2. Be creative.
3. Don't give up. If you get stuck, look at the story and question a different way.
4. Discuss your story with your family.
5. HAVE FUN!

SOLUTIONS
A FLOODING DILEMMA

A FLOODING DILEMMA

Suppose a water pipe in your house breaks. How much water will it take to fill your bedroom?

1. Answers will vary. Sample diagram and solutions

8 ft

7 ft
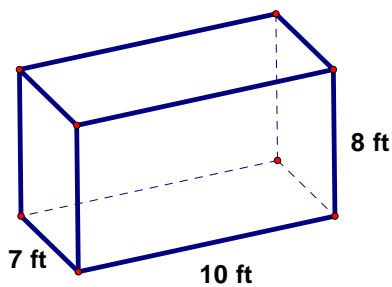
10 ft

I used a measuring tape that measures in feet and inches. I rounded each measurement to the nearest foot.

2. Answers will vary.

Dimensions in feet _7ft by 10ft by 8 ft_____

3. Answers will vary.

Volume of your room _____560 cubic feet_____ To find the volume of my room, I multiplied the length times the width times the height.

 V = Area of the base * height

   = (7*10)*8

   = 560 cubic feet

4. Answers will vary.

$$Gallons = \frac{560}{7.5}$$
$$= 74.66\overline{6}$$

My room holds approximately 75 gallons of water.

5. Answers will vary.

Sample solution based on above measurements:
a. Sheets of drywall needed: 9, 4' by 8' sheets
b. @ $10.95/sheet, it will cost $98.28

6. Answers will vary.
a. To cover all four walls, it will take just under 1 gallon of paint

7. Answers will vary. Look at Home Depot online ads (www.homedepot.com) for wood laminate lengths and prices.
a. Sample Solution

DuPont Henna Hickory 10mm T x 11.5 In. W x 46.5 In. L
Laminate Flooring
Model # FG8380   Internet/Catalog # 100529190
Store SO SKU # 227230

~~$3.97/Sq. Ft.~~

$3.18/Sq. Ft. 🚚 Free Shipping
$59.07/CA-Case Covers 18.6 Sq. Ft.
Online Special Valid: 11/19/2009 - 12/16/2009

You will need 4 cases to cover the 70 square feet.

Total Cost $236.28

8. Answers will vary.
9. If the water rose 4 feet, there was a total of 280 cubic feet of water in my room.
10. It took about 19 minutes to flood the room.

SOLUTIONS
PLANNING YOUR DREAM VACATION

All answers will vary according to the choices the student makes. Below is a sample solution

PART I: Let's plan our trip!

TRIP PLANNER	
Travel Allowance :	*$2000.00*
Destination:	*Orlando*
Number of nights away from home:	*3*
Number of days traveling:	*4*
Dates of the trip	*December 26 – December 29*
Number of family members:	*4*

I.

a.	Hotel	Hampton Inn
b.	Cost per night including room tax	$129.00
c.	Number of family members	4
d.	Number of nights in hotel	3
e.	Miscellaneous hotel expenses	0

II.   Locate the attraction(s) you will visit during your stay.

	Attraction	Entry Cost	Other Fees
1.	Magic Kingdom	80.00/person	25 food/person
2.	Universal	89.99/person	25 food/person
3.	Sea World	70.00/person	25 food/person
4.			

III.   Plan your meals.

a.	Number meals per day per person	3
b.	Cost of meals for one person per day	$40.00
c.	Number of family members	4
d.	Total cost of meals for all family members	$160.00

IV.   Estimate the cost of the gasoline for the car and determine your driving directions.

a.	Number of miles between your home and your destination	350 miles
b.	Cost of a gallon of gasoline	$2.75/gallon
c.	Car's average miles per gallon	18 mpg
d.	Total number of gallons needed for the trip	20
e.	Total cost of the gasoline	$53.48

V. Estimate your souvenir costs.

	Souvenir	Cost
1.	Mickey Mouse Stuffed animal	$20.00
2.		
3.		
4		

VI. Calculate your total trip expenses. Be sure you have included expenses for every member of your family.

TOTAL TRIP EXPENSES		
OUR DESTINATION		
		Cost
Hotels:		$387.00
Meals:		$160.00
Gasoline:		$53.48
Admission Fees:		$960.00
Souvenirs		$20.00
Food:		
Miscellaneous Fees:		
	Total:	$1580.48

PART II Budget Analysis
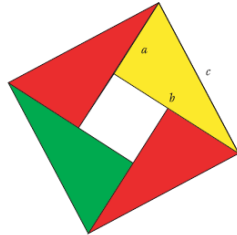
1. Based on your estimated expenses, what percent of your budget was spent on the following:
    a. Gasoline   2%
    b. Lodging   19.35%
    c. Food   8%
    d. Entertainment   48%
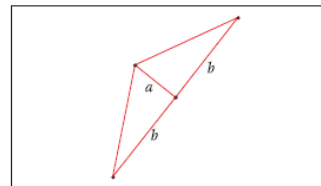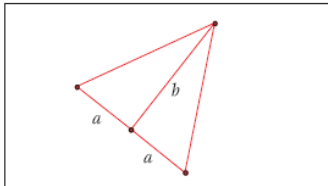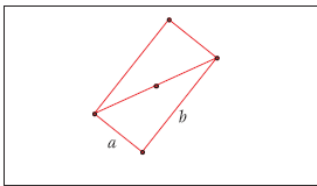   e. Miscellaneous   0%
    f. 22.65% unused

SOLUTIONS
RESTAURANT MATH

The four triangles in each plaque are congruent right triangles. Suppose we label the sides as follows:

    1. $b - a$
2. $(b - a)^2 = b^2 - 2ab + a^2$
3. Total area is ab square units. Ways:

4. $2ab + b^2 - 2ab + a^2 = b^2 + a^2$

SOLUTIONS
MATHEMATICAL QUILTS

1. No. You can trace a triangle and compare the lengths of the sides or you can import this diagram into Geometer's Sketchpad and compare the lengths.

2. The combined area of the 10 congruent triangles appears to be less than the area of the square.

3.
   a. The area of the square is 64 sq ft, the radius of the circle is 4 ft. The area of the triangle is .5 ab sinC or 10 (.5x) (4sin36°) = 32, so x is approximately 2.72 ft

   b. The value of x for which the combined area of the triangles is equal to half the area of the blue background is approximately 1.81 ft.

   c. The value of x for which the combined area of the triangles is equal to twice the area of the blue background is approximately 3.63 ft.

   d. The largest fraction of the area of the square that the combined area of the triangles could represent is 47.02 or 0.73 of the area of the square.

   e. Answers will vary.

ANTI-DISCRIMINATION POLICY

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The School Board of Miami-Dade County, Florida adheres to a policy of nondiscrimination in employment and educational programs/activities and strives affirmatively to provide equal opportunity for all as required by law:

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Title VII of the Civil Rights Act of 1964, as amended - prohibits discrimination in employment on the basis of race, color, religion, gender, or national origin.

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