Name: _____ M1300 Section: _____ E1 VM1

Directions: SHOW ALL WORK!!! Failure to show work will result in point deductions. Write legibly and neatly, being sure to **circle your final answers** for problems involving computation. Round to two decimal places in all cases. You have 1 hour and 20 minutes to complete this test. Use your time wisely!

1. This problem deals with classifications of numbers. Complete each section as directed.
   a. Which of the following number(s) are irrational? Circle those that are irrational.
      i. -2
      ii. 415
      iii. e
      iv. -5
      v. 0.1232754309…
      vi. 3.1222…

      Irrational: iii, v

   b. Give the set notation representation for the whole numbers and then draw a number line representing that set. Write the set notation for the integers and include a number line representation for that set.

      Representation: {0, 1, 2, 3, …}

   c. From the choices in part 'a', which number(s) are rational?

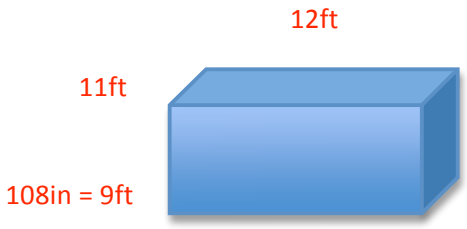
      Rational: i, ii, iv, vi

   d. Which of the numbers in part 'a' are in the set of natural (counting) numbers?

      Counting numbers: ii

2. You are remodeling a room. Your measurements for the room came out as 12 feet long by 11 feet wide. The ceiling was 108 inches high. Use this information to answer the following questions:

a. Take the above information and draw a picture representing the room. (You don't have to draw it to scale.)



b. Calculate the floor AREA of the room (use inches). Be sure to show your units and write the units in the answer!

Floor area = 11ft x 12in/1ft x 12ft x 12in/1ft = 19,008 sq in

c. Next, calculate the VOLUME of the room (use feet). Be careful!

Volume = l x w x h = 12ft x 11ft x 9ft = 1,188 cubic feet. Remember to convert 108 inches to feet before multiplying! Your units must agree for the answer to make sense.

d. You want to paint the walls of the room. You are NOT painting the floor or the ceiling. How many square feet of wall space will you need to cover with paint? If you know that one-half gallon of paint covers 180 square feet, about how many half-gallon cans of paint will you need? Round all answers to two decimal places if necessary.

Area needed to paint on front wall= 9ft x 12ft = 108 square feet The back wall is the same, so total area for both these walls is
108 square ft x 2 = 216 square feet.

Area needed to paint on side wall = 11ft x 9 ft = 99 square feet. There are two side walls with the same are, so the total are for the side walls is
99 square feet x 2 = 198 square feet.

Adding these areas gives the total wall space to cover:
198 sq ft + 216 sq ft = 414 sq ft.

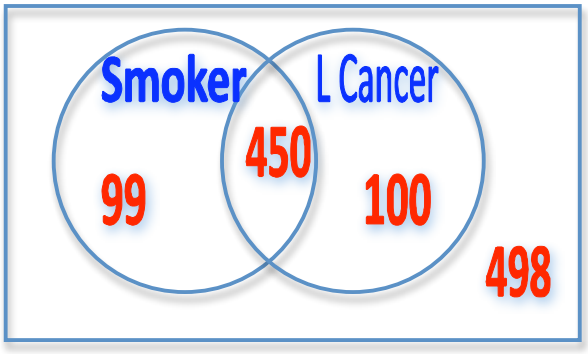
The number of half-gallon paint cans needed is then given by:

414 sq ft x (half gallon cans)/180 sq ft = 2.3 half-gallon paint cans. You can round your answer to the next highest can, or 3 half-gallon cans of paint. This is your final answer.

3. You are given the following chart representing the data collected from a medical survey. Use it to answer the questions below.

	Lung Cancer	No Lung Cancer
Smoker	450	99
Non-Smoker	100	498

a. Use the given chart to create a Venn diagram representing the given information.



There are three other possible answers.

b. How many non-smokers were there in the medical survey? How did you determine this number?

100 + 498 = 598 non-smokers. This is determined by adding the numbers in the "non-smoker" region of the Venn diagram. IE, we add all the numbers OUTSIDE of the "smoker" circle.

c. Can you say how many people in the survey had cancer? Explain WHY you chose your answer. BE CAREFUL!

No, we cannot say for certain. We only have data about LUNG CANCER. We don't know anything about other cancer types, so we don't know how many people had cancer in the survey. We do know that 450 + 100 = 550 people had lung cancer, but that's all we can say for sure.

d. Smoker and Non-Smoker are examples of what set relationship?

i. Disjoint sets ***
ii. Overlapping sets
iii. Subsets

4. Let's say you are searching for an article in an on-line database. The title of the article is "On Immigration Reform in the United States of America." Assume the author's name is "James Walton" and the name of the journal the paper was published in is "The Political Daily." In the following cases, state whether this article will appear in the search results. (Assume the database does have the article.) **EXPLAIN YOUR REASONING!**

   a. United States AND Political

      Since this is an AND statement, it is true ONLY when both of its arguments are true. Namely, "United States" and "Political" both must appear in at least one of the three fields above. Since "United States" appears in the article title and "Political" appears in the journal title, this search WILL RETURN THE ARTICLE.

   b. Reform AND James

      This is also an AND statement. Since "Reform" appears in the title of the article and "James" appears in the author field, the article WILL BE RETURNED IN THE SEARCH.

   c. Emigration OR America

      "Emigration" does not appear anywhere in the article title, author field, or journal title. Thus, the first part of the OR proposition is false. However, since America is part of the article title, and an OR statement is true when at least one of its arguments is true, it follows the OR is true in this case. Hence the article WILL BE RETURNED in the search results.

   d. (Williams AND Daily) OR America

      The parentheses tell you to evaluate what is inside of them first. Thus, we consider "Williams AND Daily." "Williams" is not part of the article title, author field, or journal name, so the AND statement must be false. Thus the first part of the OR statement is false. However, America appears in the article title, so the OR statement is true. Thus, THE ARTICLE WILL APPEAR IN THE SEARCH.