DEPARTMENT OF MATHEMATICS
BROOKLYN COLLEGE

Name:_____

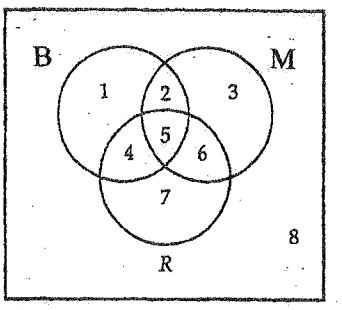
FINAL EXAMINATION – FALL 2015
Mathematics 1401 (1.95)

INSTRUCTIONS: *Answer any TEN questions.* Each problem is worth 10 points.
For **problems #1-9**, *please write all your work and answers in the* **booklet.** ***All work must be shown for full credit.***

1. (a) Results of a survey of 40 students indicate that 25 students like red jelly beans, 21 like green jelly beans, and 6 students like neither of these beans.
Let U = {all students surveyed}, R = {students who like red jelly beans}, G = {students who like green jelly beans}

(i) How many students like both types of beans?
(ii) Find $n(\overline{R \cap G})$

(b) Let U = {all objects}, B ={blue objects}, M={metal objects}, and R ={rectangular objects}.
The regions of a Venn diagram are labeled 1-8.

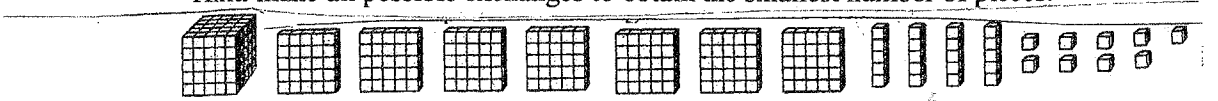


(i) Place the following object in the appropriate region.
If the object could appear in more than one location, indicate **all regions** in which it might be placed.
Item *x*: A green rectangle .

(ii) Describe the following sentence in ***set notation*** **and** indicate which **region (regions)** would represent the given set: *The set of all triangular objects that are made of plastic..*

(iii) Describe region 4 in words and in set notation .

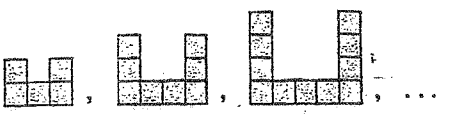
2. (a) Without converting to base ten, subtract the numbers in base TWELVE : $9E1_{twelve} - 43_{twelve}$
(b) What base- five number is represented by the base-five blocks shown below?
Hint: make all possible exchanges to obtain the smallest number of pieces.



(c) Convert 537 to a number in base THREE.
(d) Find the next two numbers in the sequence: 11_{eight}, 22_{eight}, 44_{eight}, 77_{eight}, 143_{eight}, ...

3. (a) Convert the repeating decimal 0.13888888... to a common fraction. Reduce your answer to lowest terms.
(b) Find 5 rational numbers between $\frac{2}{11}$ *and* 0.2 . If you think that there aren't any, then write NONE.
(c) 45 seconds is what fraction of an hour ?
(d) Write the number described in words as a reduced common fraction **and** as a percentage:
thirty-six thousandths

4. Assume that this pattern continues for the following sequence of square tile figures.



(a) How many square tiles are there in the 4th and the 5th figures?
(b) How many square tiles are there in the n^{th} figure?
(c) How many tiles will it take to build the 57th figure?
(d) What is the **total** number of square tiles that is needed for the first 57 figures? (Hint: use Gauss' method)
(e) Is there a figure in the sequence that is made up of exactly 593 tiles? If so, which one? If no, why not?

Name:_____

Final Exam Math 1401 (1.95) FALL 2015

5. (a) A rectangular field with dimensions 144 ft by 90 ft is to be divided into same-size square plots. The sides of the squares need to be whole numbers of feet long. What ***size*** squares are possible and ***how many*** squares of ***each size*** will fit in the field?

(b) Let **k** = 227,617,930,216,809. **Without performing the actual division**, find two *prime* factors of **k.**

6. (a) (i) Maria used $1\frac{5}{6}$ cans of paint to paint one-fifth of a wall. How many cans of paint will it take to paint the whole wall?
(Give an **exact** answer using **common fractions or mixed numbers**).

(ii) A recipe calls for $1\frac{5}{6}$ cups of flour. You want to make one-fifth of the recipe. How many cups of flour should you use?
(Give an ***exact*** answer using ***common fractions or mixed numbers).***

(iii) Conclude which of the problems can be solved by calculating $1\frac{5}{6} \div 5$.

(b) Find the Greatest Common Factor and The Least Common Multiple of the numbers 989 and 667.

7. (a) A girl has 64 in. of ribbon available to decorate doll outfits. Each outfit requires $2\frac{1}{6}$ in. of ribbon.
(i) How many outfits can be decorated?
(ii) How much ribbon will be left over?
(Give an exact answer **in inches** using **common fractions or mixed numbers).**

(b) Place parentheses, if needed, to make the following statement true: $96 \div 24 \times 2 + 6 = 32$

8. (a) A drawer contains 10 white socks, 8 gray socks, and 6 black socks.
If one sock is picked at random, what is the probability that it will NOT be black?
(Express your final answer as a percent).

(b) In a Math 1401 at Brooklyn College, ten students had the following scores on the final exam:

93, 76, 50, 98, 35, 88, 93, 40, 93, 84

- Find the mean, median, and mode of the given scores.
- Which measure is most appropriate for this set of data?

9. Answer TRUE or FALSE to the following statements. Give a brief **reason or a counterexample to justify each answer.**

(a) The sequence given bellow is *geometric* .
12, 102, 1002, 10002, 100002 ...

(b) Let K = {a, b, c, d} and L={1, 2, 3, 4}. If ***c*** must correspond to **4** in each one-to-one correspondence, then there will be 24 one-to-one correspondences between the sets K and L.

(c) To determine if 713 is prime, it is enough to test if it is divisible by 2, 3, 5, 7, and 11.

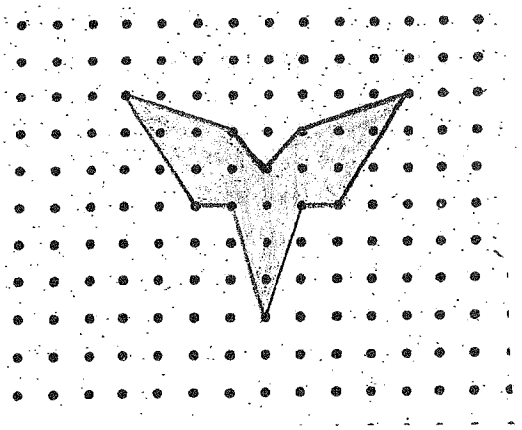
(d) $\frac{4}{7}$ *of* $42 = 42 \div 7 \times 4$

Name:_____

Final Exam Math 1401(1.95) FALL 2015

For **problems #10-11**, *PLEASE SHOW ALL YOUR **WORK** AND **ANSWERS** IN THE **SPACES PROVIDED**.*

10. In the figure on the right, assume that the distance between two adjacent dots in a row or a column is 1cm.
    (a) Is the figure *convex*?
    (b) Draw all lines of symmetry of the figure.
    (c) Determine the area of the figure.



11. A right rectangular prism is drawn to the right.
    (a) How many faces, vertices, and edges does this solid have?
    (b) Which edges are parallel to DH?
    (c) Which edges are **skew** to DH?
    (d) Suppose $EH = 8cm,\ HG = 6cm,\ DH = 15cm.$
        (i) Find the surface area of the solid.
        (ii) Find the volume of the solid.