Math 3065 Final Review

1) Divide 88 into two parts such that each part is in the same ratio as $2^2/_3$ is to 3¾.

2) Solve the following addition sentence by assigning one digit to each letter. No digit can be assigned to two different letters. After you have solved the problem **clearly** __explain__ the reasoning you used. You should use more than a "guess and check" problem solving strategy!

$$\begin{array}{r} SEND \\ +MORE \\ \hline MONEY \end{array}$$

Solution: Reasoning:

2) In class we found the following patterns could represent the letter "H" or "L" as it grows through successive iterations. Find recursive and explicit formulas for the patterns and identify each as arithmetic or geometric.

Ei	Blocks
1	10
2	15
3	20
4	25

Ai	Blocks
1	10
2	40
3	90
4	160

Hi	Blocks
1	10
2	13
3	16
4	19

3) __*Explain*__ the components of either the recursive or explicit formula for two above – diagrams may be helpful. (HINT: tell me what about the letter causes the formula to be what it is)

Pattern: _____
Explanation:

Pattern: _____
Explanation:

4) In class we found the following patterns could represent the letter "M" as it grows through successive iterations. Find recursive and explicit formulas for each pattern and identify each as arithmetic or geometric.

M1$_i$	Blocks
1	9
2	13
3	17
4	21

M2$_i$	Blocks
1	9
2	14
3	19
4	24

5) ***Explain*** the components of each recursive and explicit formula above – diagrams may be helpful. (HINT: tell me what about the letter "M" causes the formula to be what it is)
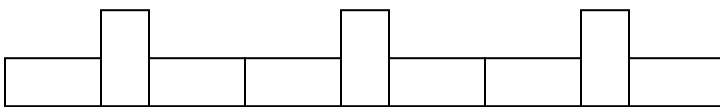
M1:

M2:

6) If the shape below represents the length and width of a paving brick. The bricks have the same dimensions in Situations I and II. Give the dimensions of the brick in inches when the following situations are true:
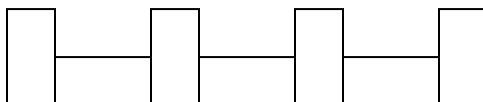
ℓ = length
w = width

Situation 1:

Total length of five feet.

Situation 2:

Total length of 45 inches.

7) Draw a balance scale that models the equation: $3x + 5 = 14$.

8) Solve the equation in #7 pictorially   and symbolically.

9) Solve the equation in #7 pictorially   and symbolically, but differently than #8.

10) Using the "quadrant mat" from AlgeBlocks, draw a picture of $(x + -1)(-x - 2) =$

11) Solve the multiplication problem in #10 in two ways:
Symbolically   Pictorially

12) Suppose there are three islands (A, B, and C) with houses on each island. There is a bridge connecting islands A and B that serves 8 houses. There is a bridge connecting islands A and C that serves 10 houses; a bridge connecting islands B and C that serves 13 houses. Draw a picture to represent this problem (label the number of houses on the Bridges, **not** the islands -- yet).

Solve the problem in two matching ways:
13) Intuitively (describe your strategy):   Algebraically:

14) When doing the Tower of Hanoi (moving disks on three pegs) we generated the following table:

Rings	1	2	3	4
Moves	1	3	7	15

Construct recursive and explicit formulae to find the number of moves based on how many rings are on the towers. Then explain why this pattern works the way it does and identify it as arithmetic or geometric.

15) If b = the number of boys in a classroom and s = the number of students in a classroom, then write an expression to represent the number of girls in the classroom.

16) If our class consists of freshmen (F), sophomores (S), juniors (J), and seniors (Z), then what does the expression $J + Z$ represent?

17) Using b = the number of boys in a classroom, s = the number of students in a classroom, F = the number of freshmen, S = the number of sophomores, J = the number of juniors, and Z = the number of seniors write an expression NOT used above and tell what it means.

18) On the back of this page is a combination chart for the school store where pencils are 15 cents and erasers are 25 cents. Find an interesting pattern to get to the blank box in the upper right. Your pattern should ***not*** use any of the gray shaded region. Made ya look – you'll have to make your own combination chart! Shade in your pattern all the way across the table, then **explain** why your pattern works.

19) Kerstie and Sylvia are going to play some golf on their Florida vacation. Sylvia can golf a round of golf in five hours and Kerstie takes three hours and forty-five minutes to complete a round of golf. Assuming both women have an entire week to play golf and they play independently of each other, how long will it take for the two of them to complete n rounds of golf?

20) Create an equation to compute the number of hours (H) it would take for Kerstie and Sylvia together to play R rounds of golf. Explain what the numbers in your equation mean and if this is an arithmetic or geometric sequence.

21) Morgan can knit a toque in three hours while Sara can knit a toque in two hours. Each woman makes her own toques and they do not work on each other's toques. Make a table showing the number of completed toques Morgan and Sara make and how many hours it takes.

22) Sketch a graph showing Morgan's and Sara's headgear production (a toque is a woman's hat – sorry guys) as well as their total production working together. Your graph should show Morgan's production, Sara's production, and their total production.

23) Construct an equation to model their toque production relative to time. Explain what the parts of the equation mean and identify this as an arithmetic or geometric sequence.

24) Calculate the number of completed toques Morgan and Sara will produce after seven hours of work.

25) I went on vacation last year over winter break. The resort would give me one token each day and I could use the token for a massage in the morning or to go snorkeling in the afternoon but not use it another day. Some days I did neither but I never did both (because I am too cheap to buy an extra token). If there were three days where I slept in and missed the massage, five days where I spent the afternoons relaxing on the beach (rather than snorkeling), and I used six tokens overall, how long was my vacation?

A. Solve this problem with a table   B. Solve this problem using equation(s).

26)) Suppose Glen and Heidi can each write a math test in two hours, but it takes Todd three hours to write a math test. Each math professor writes their own tests (since they teach different classes) and they do not work on each others' tests. Construct a table showing the number of hours worked (independent variable) and the total number of tests written (dependent variable).

27) Sketch a graph of the test writing data from #26.

28) How many completed tests will be written after an eight hour shift if all three professors work diligently?

29) How long will it take them to write a total of ten complete tests?

30) Create an equation to model this situation and identify it as an arithmetic or geometric sequence.

31) Construct a story to go with this distance / time graph: