MATH 211 FINAL EXAM REVIEW PROBLEMS

1. Show $32 \div 4$ in the sharing interpretation of division using base ten pieces

2. Show $32 \div 4$ in the measurement interpretation of division using base ten pieces

3. Write a short and simple story problem for each:
   a. Illustrating $18 \div 6$ for the sharing concept of division.

   b. Illustrating $18 \div 6$ for the measurement concept of division.

   c. Illustrating $12 - 7$ for the take away concept of subtraction

   d. Illustrating $12 - 7$ for the comparison concept of subtraction

   e. Illustrating $12 - 7$ for the missing addend concept of subtraction

4. The number $2^4 \times 3^3 \times 5^2 \times 7^1$ has exactly this many different factors:

5. The number $2^4 \times 3^3 \times 5^2 \times 7^1$ has exactly this many different PRIME factors:

6. The number 354,109,373,276,4$\underline{x}$0 will be divisible by 6 if $\underline{x}$ is replaced by____?

7. The Uris satellite circles the earth every 308 hours. The Arub satellite circles the earth every 660 hours. If both satellites were above Monroe, Louisiana at 7 AM on April 12, the earliest time they will both again be above Monroe is in this many hours:

8. Which one of the following pairs of numbers is relatively prime?
   (10, 20), (23, 46), (16, 30), (15, 42), (32, 125)

9. For this problem: Choose all, if any, that are correct.
   The number 354,109,373,286,460 is divisible by: 2, 3, 4, 5, 6, 9, 10, 11?

10. Find the LCM (1125, 70) using any method (no calculator).

11. Find the GCF (1125, 70) using any method (no calculator).

12. What is the greatest prime that must be checked to determine if 179 is prime or composite?

13. GCF(x, y) = 10. LCM(x, y) = 900. $x < y < 150$. Find x and y.

14. Explain why $2^2 \times 3^2 \times 15$ is not a prime factorization of 540.

15. If a number is not divisible by 6, can it be divisible by 3? Explain.

16. If a number is not divisible by 3, can it be divisible by 6? Explain.

17. If a number is not divisible by 6, can it be divisible by 9? Explain.

18. If a number is not divisible by 2, can it be divisible by 4? Explain.

19. If a number is not divisible by 4, can it be divisible by 2? Explain.

20. Use black and red tile models with R for red tiles and B for black tiles to show the following: Write clearly and explain your work.
    a. $7 + (-5)$
    b. $4 - 6$
    c. $3 - (-1)$
    d. 2×-4
    e. -2×-4
    f. -2×4
    g. $-9 \div 3$
    h. $-9 \div -3$

21. Closed or not?
    a. The set of whole numbers for division.
    b. The set of whole numbers for addition.
    c. The set of whole numbers for subtraction.
    d. The set of even whole numbers for multiplication
    e. The set of integers for multiplication.
    f. The set of integers for division.
    g. The set of negative integers for addition.
    h. The set of positive integers for subtraction.
    i. The set of even integers for subtraction.
    j. The set of odd integers for subtraction.
    k. The set of {0, 1} for addition
    l. The set of {0, 1} for multiplication

22. Commutative or not?
    a. The set of whole numbers for division.
    b. The set of whole numbers for addition.
    c. The set of whole numbers for subtraction.
    d. The set of integers for multiplication.
    e. The set of integers for division.
    f. The set of negative integers for addition.
    g. The set of even integers for subtraction.
    h. The set {0, 1} for addition
    i. The set {0, 1} for multiplication

23. Associative or not?
    a. The set of whole numbers for division.
    b. The set of whole numbers for addition.
    c. The set of whole numbers for subtraction.
    d. The set of integers for multiplication.
    e. The set of negative integers for addition.
    f. The set of even integers for subtraction.

24. Identity
    a. What is the identity for whole numbers for addition? For integers?

b. What is the identity for whole numbers for multiplication? For integers?

25. Distributive
    a. What is the distributive property for whole numbers for multiplication over addition? For integers? For multiplication over subtraction?
    b. What is the distributive property for integers for multiplication subtraction?

26. Valid or invalid?
    All children love to draw.
    Cindy is a child.
    Therefore, Cindy loves to draw.

27. Valid or invalid?
    Some educated people are rascals.
    Doctors are educated people.
    Therefore, doctors are not rascals.

28. List the factors of 12. List the first 4 multiples of 12.

29. Rewrite each of the following using i) converse, ii) inverse and iii) contrapositive. In each case use a Venn diagram to show whether the new statement is valid or invalid.

    a. If I buy apples then I have fruit to eat.

    b. I will wash my dog if it is hot out.

    c. I will not take Math 212 in the winter if I don't study for the math 211 final.

30. Write 1247_{ten} in expanded form (base 10).

31. How many units are in 1847_{nine}?

32. What are the digits in any base b?

33. What are the place values in any base b?

34. Sketch the base four number pieces representing this addition, including all regroupings. Show the addition algorithm and record the resulting base four numeral.
    $2311_{four} + 203_{four}$

35. Sketch the base four number pieces representing this subtraction, including all regroupings. Show the subtraction algorithm and record the resulting base four numeral.
    $222_{four} - 133_{four}$

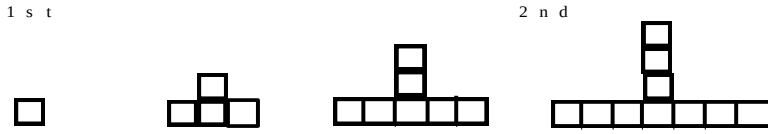
36. Sketch the base four number pieces representing this multiplication; including all regroupings. Show the multiplication algorithm and record the resulting base four numeral.

$22_{four} \times 13_{four}$

37. Select 4 flats, 6 longs, and 2 units from your base ten pieces. Using <u>only</u> these pieces (all of them), and making no exchanges, form a rectangle.

    Neatly sketch the rectangle you made, label the edge dimensions and the four partial products and show the final product it represents.

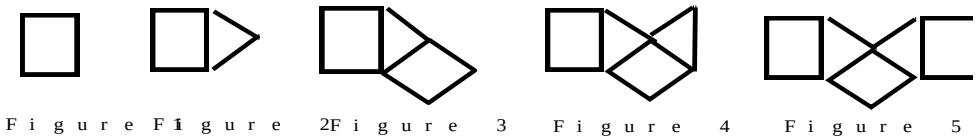
38. Study the pattern below.



    a. If this pattern of tiles continues, draw the 5th figure.

    b. If this pattern of tiles is extended to the 150^{th} figure, describe the 150^{th} figure.

39. The following sequence of figures begins repeating in the fifth figure.



    a. Describe and draw the 6th figure.

    b. How many triangles will there be in the 163^{rd}, the 164^{th} and the 166^{th} figures? Explain clearly for credit, a long list of numbers will receive no credit.

40. Arithmetic, geometric and/or finite differences?
Find a pattern in the following sequence and write the next two terms of the sequence.
    2, 5, 8, 11, 14, …

41. Arithmetic, geometric and/or finite differences?
Find a pattern in the following sequence and write the next two terms of the sequence.
    2, 5, 12, 24, 42, ….

42. Arithmetic, geometric and/or finite differences?
Find a pattern in the following sequence and write the next two terms of the sequence.
    3, 12, 48, 192, …

43. Arithmetic, geometric and/or finite differences?
Find a pattern in the following sequence and write the next two terms of the sequence.
    0, 1, 7, 18, 34, …

44. Determine the equation of the lines:
    a. Between (2,6) and (-3, 4)

    b. Between (2,-2) and (-3, 4)

    c. Parallel to y = 3x -4 and through (1, 1)

    d. Perpendicular to y = 3x -4 and through (1, 1)

45. Simplify or solve
    a. $2(x + 3) – 3(x + 2) = 4x$

    b. $-3x < -7x + 14$

    c. $2(x + 1) – 4(x + 6) + 2(x – 4)$

46. Circle to indicate if each statement is true or false. Explain.
    Let: Universal Set = {5, 6, 7, 8, 9, 10} A = {5, 6, 9} B = {5, 6} C = {7, 8, 9}

			Explain
a.	T	F	$A \subseteq B$
b.	T	F	$5 \in B$
c.	T	F	$B \subset B$
d.	T	F	$(A \cup C)' = \{10\}$
e.	T	F	$B = C$
f.	T	F	$A \cap B = \{5, 5, 6, 6\}$

47. Using your attribute piece set, let Y=Yellow pieces L=large pieces, H=hexagons. Describe:
    a. $Y \cup L$

    b. $Y \cap L$

    c. $(Y \cup H)'$

    d. $Y \cap L \cap H$

    e. $(Y \cap L \cap H)'$

    f. $(Y \cup L \cup H)'$

    g. Describe two sets of attribute pieces, A & B, so that $A \cap B = \varnothing$

48. Determine the following:

a. $6 \div 2 \times 3 + (4 - 1)^2$

b. $4 \times (3+1) - 2^4$

c. $18 - 3 \times 2 \div 2 + 7$

d. $12 + 7 - 8 \div 4 - 1 \times 7$

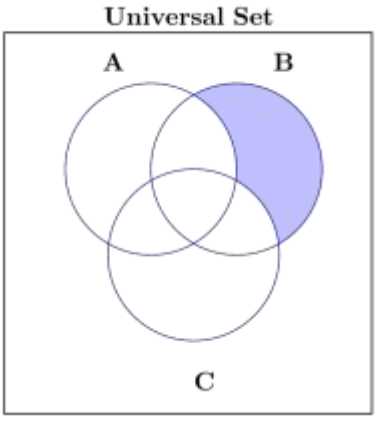
49. Use Polya's four steps for problem solving to solve the following:

a. A farmer is building a fence in the shape of a rectangle of dimensions 30 yards by 40 yards. There is a fence post in every corner and one every two yards. How many fence posts will he use?

b. Jill's mother gave her some money to go shopping. Jill spent half the money on a new pair of shoes, then she spent $10 on a CD. After that she spent half of what was left over on lunch and had $12 left. How much money did her mother give her?

50. For each of the following write the set notation that describes the shaded region:

a.



b.