MAT 121 f2f, FINAL TEST, Fall, 2012
200 Points   Name_____

This is our final learning opportunity together, and I'm hoping to take full advantage.
Read the questions carefully. Sometimes, you can earn points on a problem by *knowing*
that you did it wrong and *explaining* how you know and what you're *trying* to
accomplish, and *how* you're going about it.

1.   Solve the equation $x^2 - 3x - 10 = 0$ in three different ways:

   part a   (15 pts) Factoring

   part b   (15 pts) Completing the square

   part c   (15 pts) Quadratic formula

2. (15 pts) Sketch the graph of $f(x) = x^2 - 3x - 10$. Include vertex, intercepts and be true to its shape. (No zig-zagging to make it go through calculated points.)

3. Solve the absolute value inequality. Give your answer in set-builder *and* interval notation.

part a   (10 pts) $|7x + 2| < 4$ **part b**   (10 pts) $|2x - 7| \geq 4$

4. Let $f(x) = \sqrt{x-18}$ and $g(x) = x^2 + 3x - 10$

   part a   (10 pts) What's the domain of $f(x)$? Give the answer in set-builder and interval notation.

   part b   (10 pts) Determine $(f \circ g)(x)$. Simplify your answer.

   part c   (10 pts) What's the domain of $(f \circ g)(x)$? Give your answer in set-builder and interval notation.

5. (10 pts) What is the domain of $h(x) = \sqrt{(x-2)^3(x+1)(x-4)^2}$?

6. (10 pts) What is the domain of $\sqrt{\dfrac{(x-2)^3(x+1)}{(x-4)^2}}$? The hard part's done...

7. (10 pts) Use synthetic division to find $f(2)$ for $f(x) = x^4 - 5x^3 - 3x^2 + 43x - 6$

8. (10 pts) Determine a, r and n for the finite geometric series $5 + 15 + 45 + ... + 10935$

Then use a, r, and n to determine the sum by the formula $\displaystyle\sum_{k=1}^{n} a \cdot r^{k-1} = a\left(\dfrac{1-r^n}{1-r}\right)$.

9. (10 pts) How many ways can you pick 3 people from a group of 20 people to do a job for you? CHOOSE!

10. (10 pts) How many ways can you pick 3 people from a group of 20 people and then assign each of the 3 people to a different job? CHOOSE AND ARRANGE!

11. (10 pts) Use Pascal's Triangle (Binomial Theorem!) to help you expand $(2x - 3)^5$. Expanding without using this technique will not earn any points.

$$A = P\left(1+\frac{r}{m}\right)^{mt} = P(1+i)^n \qquad\qquad FV = S = R\left(\frac{(1+i)^n - 1}{i}\right)$$

Previous semesters I used "FV" for future value of an annuity. I used 'S' this semester.

12. (10 pts) What's the future value, in 10 years, of $10,000 deposited into a savings account, earning 4.3% annual percentage rate, compounded daily?

13. (10 pts) An annnuity consists of monthly payments of $407 into an account earning 6% annual interest, compounded monthly, for 6 years. There are two ways to ask this question:

First way: How much does JG Wentworth feel that this annuity is worth?   "I have a long-term settlement but I need cash NOW!"

Second way: If the annuity described is actually your monthly loan payments, how much did you borrow in the first place?