

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 $x^2 - 2x - 15 = 0$ in three different ways:

part a (10 pts) Factoring

part b (15 pts) Completing the square

part c (15 pts) Quadratic formula

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

part a (10 pts) $|7x + 2| \geq 4$

part b (10 pts) $|2x - 7| < 4$

3. Let $f(x) = \sqrt{x-14}$ and $g(x) = x^2 - 3x - 14$

part a (15 pts) What's the domain of $f(x)$? Give the answer in set-builder and interval notation.

part b (15 pts) Determine $(f \circ g)(x)$. Simplify your answer.

part c (5 pts) What's the domain of $(f \circ g)(x)$? Give your answer in set-builder and interval notation.

4. (15 pts) Solve $(x-2)^3(x+1)(x-4)^2 > 0$. Give the solution set in 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 $\sqrt{\frac{(x-2)^3(x+1)}{(x-4)^2}}$? The hard part's done...

7. (10 pts) Use synthetic division to find $f(3)$ for $f(x) = x^4 - 5x^3 - 3x^2 + 43x - 60$

8. (10 pts) Determine a , r and n for the finite geometric sequence $2, \frac{4}{5}, \frac{8}{25}, \dots, \frac{256}{78125}$

Use a , r , and n to determine the sum by the formula $\sum_{k=1}^n a \cdot r^{k-1} = a \left(\frac{1-r^n}{1-r} \right)$. A

fractional answer is better, but I'll give you most of the points if you provide a decimal answer that is accurate to 4 decimal places.

9. (10 pts) Find the sum of the infinite series $\sum_{k=1}^{\infty} 4 \cdot \left(\frac{3}{4} \right)^{k-1} = 4 + 4 \cdot \frac{3}{4} + 4 \cdot \left(\frac{3}{4} \right)^2 + \dots$

Finance Formulas:

$$A = P \left(1 + \frac{r}{m} \right)^{mt} = P(1 + r)^n$$

$$FV = R \left(\frac{(1 + i)^n - 1}{i} \right)$$

10. (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?

11. (10 pts) An annuity consists of monthly payments of \$600 into an account earning 8.4% annual interest, compounded monthly, for 10 years. There are two ways to ask this question:

First way: How much does JG Wentworth feel that this annuity is worth?

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

Bonus (10 pts) Use Pascal's Triangle (Binomial Theorem!) to help you expand $(x - 2)^4$.

Expanding without using this technique will not earn any points.

12. (15 pts) Sketch the graph of $g(x) = 3 \cdot 2^{2x-4} - 5$ by transforming the basic function $f(x) = 2^x$. Show x - and y -intercepts.