

Math 1210 Prerequisite Review, Part 2

Please use additional sheets of paper for this assignment. For full credit, the work must be legible and easy to follow.

I. The Basic Trigonometric Functions

For each of the following functions:

- a. State the domain and range
- b. On the interval $[-2\pi, 2\pi]$, state any intercepts as (x, y) ordered pairs
- c. Graph the function on the interval $[-2\pi, 2\pi]$. Be sure to show intercepts and amplitude.

1. $y = \sin x$
2. $y = \cos x$
3. $y = \tan x$
4. $y = \csc x$
5. $y = \sec x$
6. $y = \cot x$

II. Solving Equations

Solve each equation below, showing all steps in a clear and logical order. Answers must be **exact** (not approximations). Answers for trigonometric equations must be given in radians.

1. $5x^2 - 2x - 1 = 0$
2. $e^x - 5 = \sqrt{3}$
3. $\ln(3x - 1) = 4$
4. $2 \cos x + \sqrt{2} = 0$
5. $\arcsin x = \frac{1}{2}$

III. Algebra Review

Some of the most important algebraic simplifications will answer questions like what is $0/0$? What happens when you divide very large numbers? Or what happens when you subtract very large numbers?

1. Factoring

a. Reducing

Example:
$$\frac{x^2 - x - 6}{x^2 - 9} \Rightarrow \frac{(x-3)(x+2)}{(x-3)(x+3)} \Rightarrow \frac{x+2}{x+3}; \quad x-3 \neq 0$$

What happens when $x = 3$?

b. Add/subtract rational expressions (multiply by "1")

Example:
$$\frac{5}{x^2 - 3x + 2} - \frac{3}{x^2 - 1}$$
$$\frac{5}{x^2 - 3x + 2} - \frac{3}{x^2 - 1} \Rightarrow \frac{5}{(x+1)(x+2)} - \frac{3}{(x-1)(x+1)}$$

Find a common denominator!

What happens when $x = -1$?

2. Rationalizing (multiply by "1"). Question: Can you just square numerator & denominator?

Example:
$$\frac{x^2 - 9}{\sqrt{x-3}}$$

$$\frac{x^2 - 9}{\sqrt{x-3}} \cdot \frac{\sqrt{x-3}}{\sqrt{x-3}} \Rightarrow \frac{(x^2 - 9) \cdot \sqrt{x-3}}{x-3}$$

Now reduce. What happens when $x = 3$?