

YOUR NAME: _____

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Read each problem **very carefully** before starting to solve it. Each problem is worth 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. If two resistors with resistances R_1 and R_2 are connected in parallel, then the total resistance R of the resulting circuit (all measured in Ohms (Ω)), is given by

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}.$$

If R_1 and R_2 are increasing at rates $0.3 \Omega/\text{sec}$ and $0.2 \Omega/\text{sec}$, respectively, how fast is R changing when $R_1 = 80 \Omega$ and $R_2 = 100 \Omega$?

2. Find the domain of the function $f(x) = \sqrt{1 - 2^x}$.

3. Compute the limits $\lim_{x \rightarrow +\infty} \frac{e^{3x} - e^{-3x}}{e^{3x} + e^{-3x}}$ and $\lim_{x \rightarrow +\infty} (e^{-2x} \cos x)$. Please, be as formal as you can and show all your work.