# ECE 3 Lab 2 Prelab

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## Problem 1

$$\text{RMS} = \sqrt{\frac{1}{T} \int_0^T f^2(t) dt}$$

$$= \sqrt{\frac{1}{T} \int_0^T a^2 dt}$$

$$= \sqrt{a^2} = a$$

$$V_{pp} = 2a$$

$$\frac{\text{RMS}}{V_{pp}} = \boxed{\frac{1}{2}}$$

# Problem 2

$$\text{RMS} = \sqrt{\frac{1}{T} \int_0^T f^2(t)dt}$$

$$= \sqrt{\frac{2}{T}\left(\int_0^{\frac{T}{4}}\left(\frac{4at}{T}\right)^2 dt + \int_{\frac{T}{4}}^{\frac{T}{2}}\left(\frac{4a(\frac{T}{2}-t)}{T}\right)^2 dt\right)}$$

$$= \frac{4a}{T}\sqrt{\frac{2}{T}\left(\frac{\left(\frac{T}{4}\right)^3}{3} + \frac{\left(\frac{T}{4}\right)^3}{3}\right)}$$

$$= \frac{4a}{T}\sqrt{\frac{2}{T}\left(\frac{\left(\frac{T}{4}\right)^3}{3} + \frac{\left(\frac{T}{4}\right)^3}{3}\right)}$$

$$= \frac{a}{\sqrt{3}}$$

$$V_{pp} = 2a$$

$$\frac{\text{RMS}}{V_{pp}} = \boxed{\frac{1}{2\sqrt{3}}}$$

# Problem 3

wrong Probe Attenuation

# Problem 4

Wrong Function Generator Output Impedance

# Problem 5

To filter out the DC components.