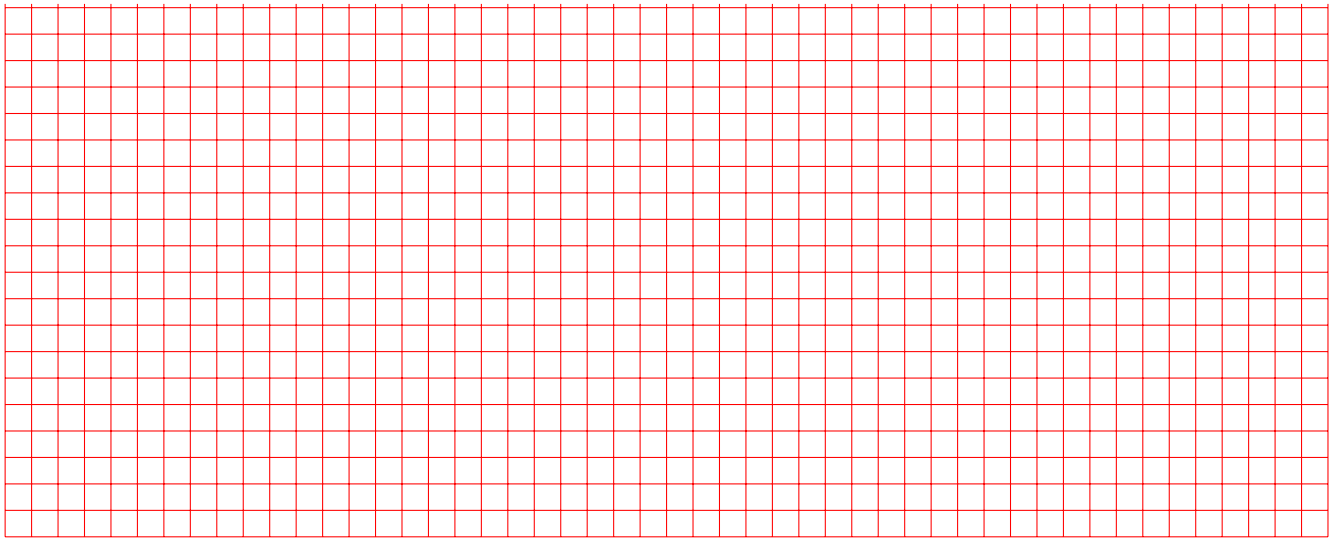
Tools Of The Trade - Preparation

- **Name:** **Lab Date:**
- **Student No.:** **Day of the week:** **Time:**

1. Explain the difference between the Fourier Series and the Fourier Transform. **(1pt)**

2. Write the compact trigonometric Fourier Series for a square wave with and without a DC component (up to 4 elements in the series). Identify the fundamental and its harmonics in the equation. **(2pt)**

3. Draw the time domain and frequency domain representation of the square wave above, identifying the fundamental and its harmonics. Assume the fundamental frequency of your square wave to be 1KHz, and the amplitude to be 1 V_p. (Review Fourier Transform) Plot the vertical axis of the frequency domain plot as *magnitude squared*. Graphs drawn with missing values and labels will receive a zero. **(3pt)**



4. What prevents one from exactly reconstructing a square wave by adding up sinusoidal comsdfsdfponents? Explain this phenomenon. **(2pt)**

5. Now suppose that instead of a square wave you have a pulse with a 1% duty cycle, and a period of 1ms. Draw the time domain and frequency domain representation of that signal. What is different from the previous case? **(2pt)**