

**PROBLEMS YOU SHOULD BE ABLE TO DO
BEFORE YOU TAKE ECE 109**

FALL 1995

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1. Without using a calculator, find and then express in scientific notation
 - a. $100 (38)$
 - b. $100 (38.57)$
 - c. $65.7/100$
2. Without using a calculator, estimate
 - a. $9 (107)$
 - b. $94 (53)$
 - c. $513/97$

3. Solve – preferably with a calculator – the simultaneous linear equations

$$\begin{aligned} 3x + 2y &= 15 \\ -4x + 6y &= -5 \end{aligned}$$

4. Given the following three charges



What is the direction of the force on the charge in the middle. How do you know

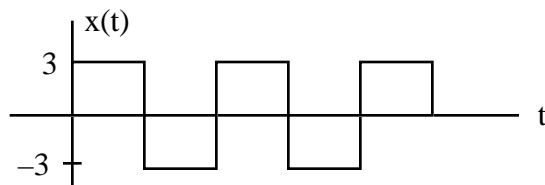
5. Sketch the potential energy of a mass M as a function of its distance above the ground
6. What are functions. Draw a graph of a function and a graph that is not a function. What's the difference
7. Sketch each of the following functions

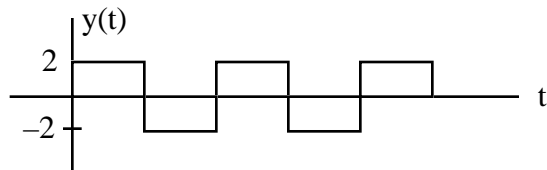
a. $y = 5x$	g. $y = 2 \cos (x - \pi/4)$
b. $y = 5x + 2$	h. $y = 2 \cos (x + \pi/4)$
c. $y = 5x - 2$	i. $y = \cos 2x$
d. $y = -5x - 2$	j. $y = 2 \cos (2x - \pi/4)$
e. $y = \cos x$	k. $y = 2 \cos (2x + \pi/4)$
f. $y = 2 \cos x$	l. $y = 2 + 2 \cos 2x$

8. Sketch each of the following functions

$$\text{a. } y = \frac{5}{x+5} \qquad \text{b. } y = \frac{x}{x+5} \qquad \text{c. } y = \frac{x}{x^2+5}$$

9. Sketch the product $z(t) = x(t)y(t)$ given $x(t)$ and $y(t)$ as follows





10. Draw a graph of a function $y(t)$ that satisfies $y(0) > 0$ and $y'(0) < 0$