Math1850: Calculus I
Practice problems for test1
Instr: Dr. Nagisetty

1. Section 1.1: Ex. 17,18,19,27,41,43,47.
2. Section 1.2: Ex. 5,7,13,41,49,55,59,65.
3. Express the surface area of a cube in terms of its volume.[Hint: Express first the surface area and the volume in terms of its edge length x and then think.]
4. Characterize the following functions as even or odd or neither giving reasons:
   (a) $f(x) = x^2 + x^4$
   (b) $f(x) = x - 2x^3$
   (c) $f(x) = x + x^2$
5. A Norman window has the shape of a rectangle surmounted by a semi-circle. If the perimeter is 40 ft. express the area of the window in terms of its width.
6. The manager of a furniture factory finds that it costs \$2200 to produce 100 chairs in one day and \$4800 to produce 300 chairs in one day.
   (a) Express the cost as a function of the number of chairs produced, assuming it is linear.
   (b) What is the slope of the graph and what does it represent?
   (c) What is the y-intercept of the graph and what does it represent?
7. If $f(x) = 1 - \sqrt{x}, g(x) = \sqrt{x-1}$, find their domains and describe $f \circ g, f \circ f, g \circ g, g \circ f$ along with their domains.
8. Use the table to evaluate $f(g(1)), g \circ f(3), f \circ g(6)$.

x	1	2	3	4	5	6
f(x)	3	1	4	2	2	5
g(x)	6	3	2	1	2	3

9. If an arrow is shot upward on the moon with a velocity of 58 m/s, its height in meters after t seconds is given by $h = 58t - 0.83t^2$. Find the average velocity in the time interval $[t, t+h]$. Calculate the instantaneous velocity at time t. Evaluate the average velocity in the interval $[1, 1.5]$ and also the instantaneous velocity at $t = 1$.

10. Find the $\lim_{x\to 1} \dfrac{\sqrt{x} - x^2}{1 + \sqrt{x}}$

11. Find the $\lim_{x\to 1} \dfrac{\sqrt{x} + x^2}{1 - \sqrt{x}}$

12. Find the $\lim_{x\to 1} \dfrac{1 - x^2}{1 - \sqrt{x}}$

13. Find the $\lim_{x\to 4} \dfrac{x^3 - 64}{x - 4}$ (Notice that both numerator and denominator tend to zero and try division.)

14. Find the $\lim_{x\to -2} \dfrac{x^3 + 8}{x^2 - 4}$(Notice that both numerator and denominator tend to zero. Try factoring and canceling common factors.)