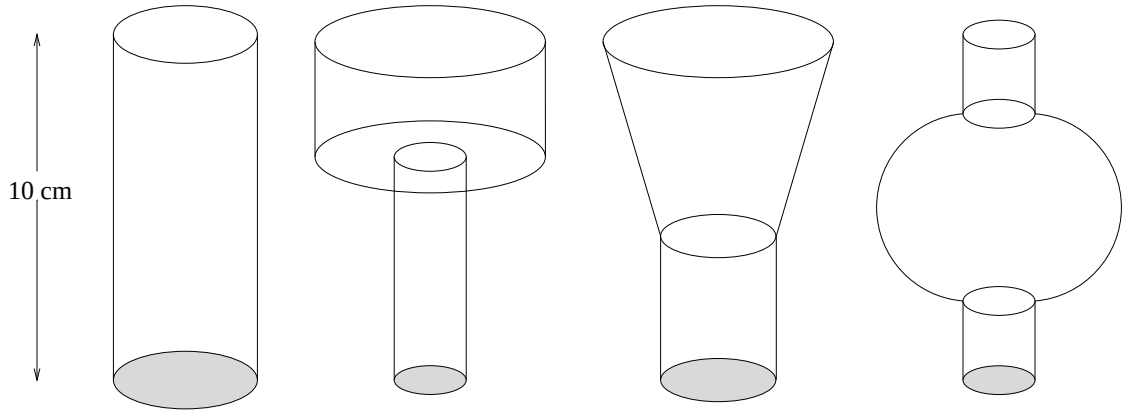
1. Four containers are each 10 cm tall. Each of them has a volume of 30 cm^3 and each is being filled by a liquid at the rate of 5 cm^3 per minute. Here is a picture of the containers:



(A) (B) (C) (D)

a) For each of the containers, graph the height, $h(t)$, of the level of the liquid in the containers measured in centimeters as a function of time, t, measured in minutes.

b) Which of the functions graphed in a) are continuous? Explain your answers.

c) Which of the functions graphed in a) are differentiable? Explain your answers.

2. Values of a twice differentiable function, f, and its first and second derivatives are in the table to the right. Use this information to answer the following questions as well as you can.

x	$f(x)$	$f'(x)$	$f''(x)$
1	2	0	2
2	3	6	5
3	7	3	-4
4	2	5	7

a) If $g(x) = \big(f(x)\big)^2$, compute $g(2)$, $g'(2)$, and $g''(2)$.

b) If $h(x) = f(x^2)$, compute $h(2)$, $h'(2)$, and $h''(2)$.

c) If $k(x) = f(f(x))$, compute $k(2)$, $k'(2)$, and $k''(2)$.

3. An unidentified object moves along the s-axis, with displacement $s = s(t)$ (meters), velocity $v = v(t)$ (m/sec) and acceleration $a = a(t)$ (m/sec^2). It so happens that the velocity and displacement are related by the equation $v = \sqrt{8s + 16}$. Moreover, at the instant $t = 0$, the object is observed at $s = 6$.

a) Show that a is constant, and find its value.

b) Graph v as a function of s.

c) Graph v as a function of t.

One problem will be selected for a writeup to be handed in at the next recitation meeting. Please see Professor Greenfield's Math 151 webpage to learn which problem to hand in.