MATH 31	Name
Applications of Derivatives – HW #2	Date
1. Sand pouring from a conveyor belt forms a conical pile, the radius of which is $\frac{3}{4}$ of the	
height. The sand is piling up at a constant rate of $0.5 \frac{m^3}{min}$. At what rate is the height of the	
pile growing 3 minutes after the pouring starts?	

- 2. When a small pebble is dropped in a pool of still water, it produces a circular wave that travels outward at a constant speed of 15 cm/s. At what rate is the area inside the wave increasing when
 - a) the area is $400\pi \ cm^2$?

b) 4 s have elapsed?

3. A lady, 5 feet tall, is walking away from a lamppost that is 25 feet high. The lady is 15 feet from the lamppost and walking at a rate of 2.5 feet/second. At what rate is her shadow increasing? [Round your answer to the nearest tenth.]

4. Gas is escaping from a spherical weather balloon at a rate of $500^{\text{cm}^3/\text{min}}$. How fast is the surface area, *S*, shrinking when the radius is 15 meters? $V = \frac{4}{3}\pi r^3$ and $SA = 4\pi r^2$