WORKSHEET: RELATED RATES 4

Names and student IDs: _____

A cocktail glass has the shape of an upside down cone of height 12 centimeters and diameter 6 centimeters at the top. It is filled to a depth of 8 centimeters with a mixture of vodka, rum, tomato juice, and Cointreau. Its owner, high on recently legalized marijuana, thinks the level of the cocktail is rising at $\frac{1}{10}$ centimeters per minute. According to this illusion, is its volume increasing or decreasing? How fast?

(You must tell me whether it is increasing or decreasing, as well as formulating the rate correctly, including correct units.)

Bonus question: What should the penalty be for wasting good Cointreau by putting it in such a concoction and drinking it while high on marijuana?

A 6 foot pendulum hangs from a high ceiling, and is slowly swinging back and forth. At a particular time, the angle between the pendulum chain and a vertical line was $\frac{\pi}{6}$ radians and was increasing at 3 radians per minute. Was the height of the pendulum bob above the ground increasing or decreasing? At what rate?

(You must tell me whether it is increasing or decreasing, as well as formulating the rate correctly, including correct units.)

Date: Wednesday 29 November 2017.