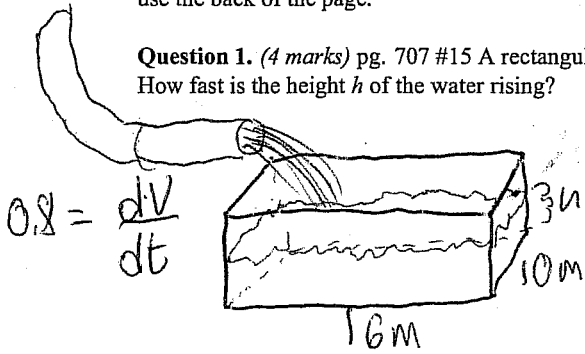


### Quiz 5

This quiz is graded out of 10 marks. No books, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

**Question 1.** (4 marks) pg. 707 #15 A rectangular swimming pool 16 m by 10 m is being filled at a rate of  $0.8 \text{ m}^3/\text{min}$ . How fast is the height  $h$  of the water rising?



$$V = lwh$$

$$V = 16(10)h$$

$$V = 160h$$

Looking for  $\frac{dh}{dt}$

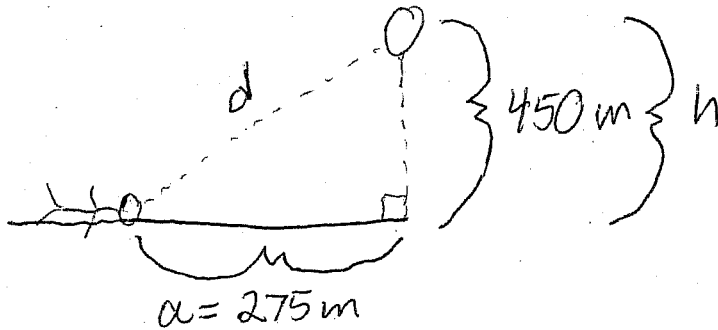
$$\frac{d}{dt}[V] = \frac{d}{dt}[160h]$$

$$\frac{dh}{dt} = 0.005 \text{ m/min}$$

$$\frac{dV}{dt} = 160 \frac{dh}{dt}$$

$$0.8 = 160 \frac{dh}{dt}$$

**Question 2.** (6 marks) pg. 707 #35 A weather balloon leaves the ground 275 m from an observer and rises vertically at 12 m/s. How fast is the line of sight from the observer to the balloon increasing when the balloon is 450 m high?



Looking for  $d'$

$$a^2 + b^2 = d^2$$

$$d = \sqrt{a^2 + h^2}$$

$$\frac{d}{dt}["] = \frac{d}{dt}[""]$$

$$d' = \frac{1}{2\sqrt{a^2 + h^2}} (2hh')$$

$$= \frac{1}{\sqrt{(275)^2 + (450)^2}} \cdot (450) \cdot 12$$

$$= \frac{5400}{\sqrt{(275)^2 + (450)^2}}$$

$$= 10.2 \text{ m/s}$$