

Math 1171
Homework #7

Section 2.7 #9b,c

Section 2.8 #16, 7, 13

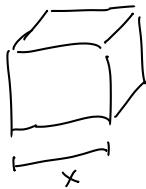
2.7 #9b,c $h = 2 + 24.5t - 4.9t^2$

$$v = 24.5 - 9.8t$$

b When $v = 0$: $24.5 - 9.8t = 0$
 $24.5 = 9.8t$
 $t = 2.5 \text{ sec}$

c at $t = 2.5$,
 $h = 2 + 24.5 \cdot 2.5 - 4.9 \cdot 2.5^2$
 $= 32.625 \text{ m}$

2.8 #16



$$V = x^3$$

$$\frac{dV}{dt} = 3x^2 \frac{dx}{dt} \quad \text{plug } x=15, \quad \frac{dx}{dt} = 4$$

$$\frac{dV}{dt} = 3 \cdot 15^2 \cdot 4 = 2700 \frac{\text{cm}^3}{\text{s}}$$



$$V = \pi r^2 h$$

$$V = \pi \cdot 5^2 \cdot h$$

$$V = 25\pi h$$

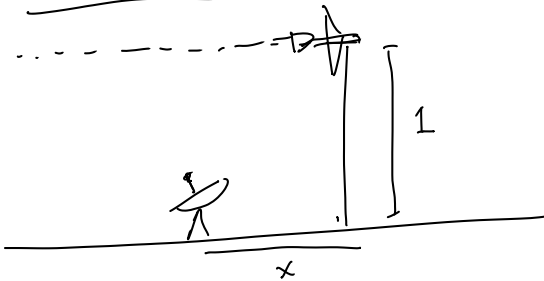
$$\frac{dV}{dt} = 25\pi \frac{dh}{dt}$$

$$3 = 25\pi \frac{dh}{dt}$$

$$\frac{dh}{dt} = \frac{3}{25\pi} = .038 \text{ m/min}$$

plug in $\frac{dV}{dt} = 3$,
solve for $\frac{dh}{dt}$

2.8 #13



$$x^2 + 1 = h^2$$

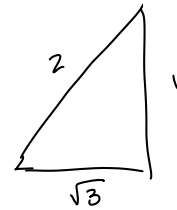
$$2x \frac{dx}{dt} = 2h \frac{dh}{dt}$$

solve for $\frac{dh}{dt}$, plug $h = 2$

$$\frac{dx}{dt} = 500$$

$$x = ?$$

when $h = 2$, $x = \sqrt{3}$



$$2 \cdot \sqrt{3} \cdot 500 = 2 \cdot 2 \cdot \frac{dh}{dt}$$

$$\frac{dh}{dt} = \sqrt{3} \cdot 250 = 433 \text{ mi/h}$$