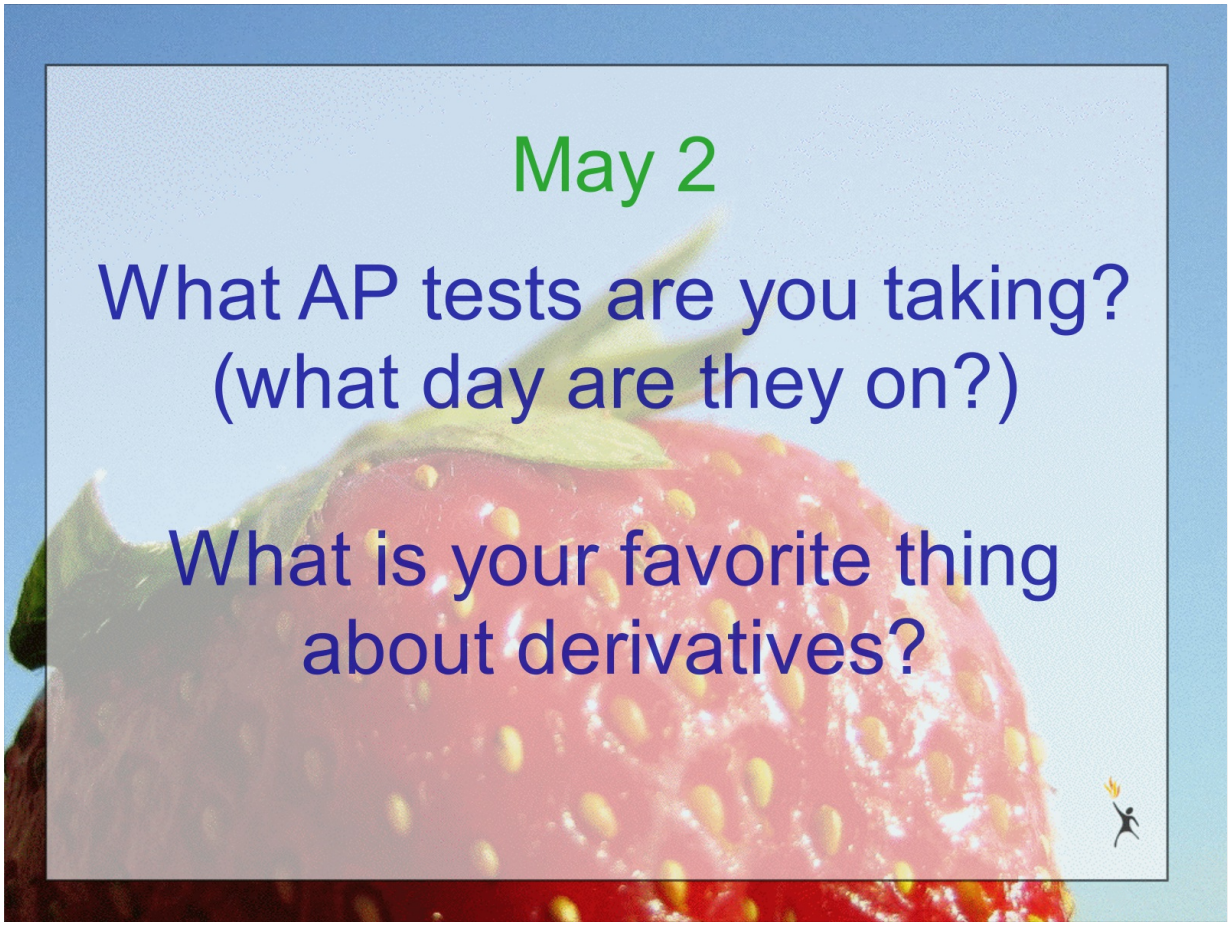
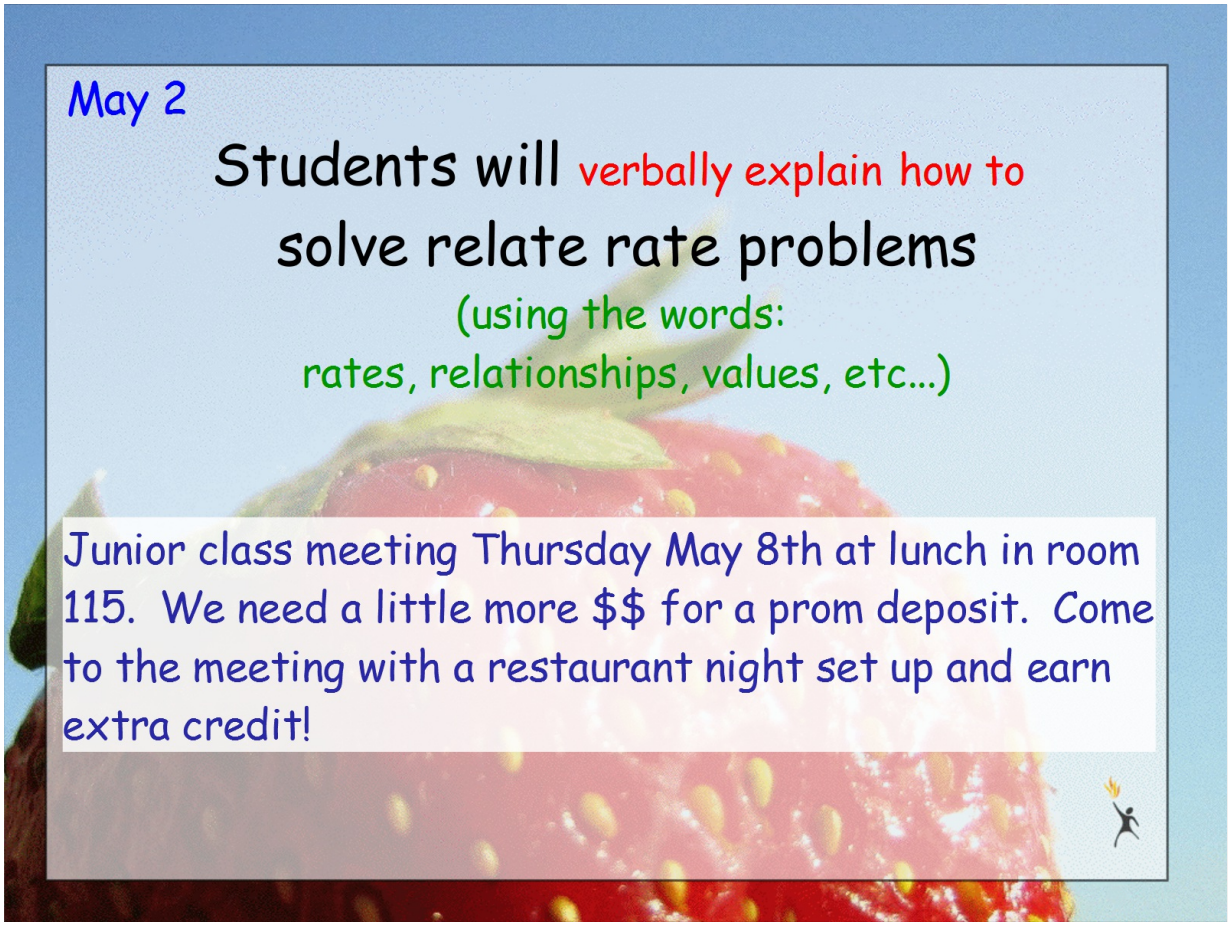
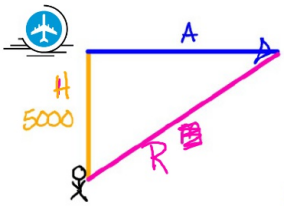

May 2
What AP tests are you taking?
(what day are they on?)
What is your favorite thing
about derivatives?


May 2
Students will verbally explain how to
solve relate rate problems
(using the words:
rates, relationships, values, etc...)
Junior class meeting Thursday May 8th at lunch in room 115. We need a little more $$ for a prom deposit. Come to the meeting with a restaurant night set up and earn extra credit!

Problem B

An observer is tracking a plane flying at 5000 feet. The plane flies directly over the observer on a horizontal path at a 10,000 ft/min. What is the rate of change of the distance between the observer and the plane when the plane has traveled 7000 feet?



rates

$\frac{dA}{dt} = 10{,}000$

$\frac{dR}{dt} = ?$

$\frac{dH}{dt} = 0$

relationships

$A^2 + H^2 = R^2$

values

$A = 7000$

$H = 5000$

$R = 8602.325$ $\quad 7000^2 + 5000^2 = R^2$

$$A^2 + 5000^2 = R^2$$

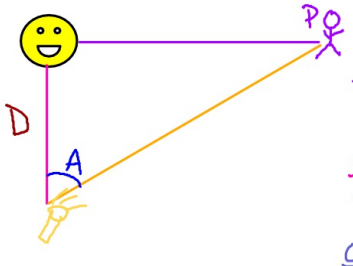
$$2A\frac{dA}{dt} + 0 = 2R\frac{dR}{dt}$$

$$\frac{2(7000)(10000)}{2(8602.325)} = \frac{2(8602.325)\left(\frac{dR}{dt}\right)}{2(8602.325)}$$

$$\frac{dR}{dt} = 8137.335 \text{ ft/min}$$

Problem C

A person walks along a straight path at a 4 m/sec. A searchlight on the ground, 20 meters from the path, rotates to keep focused on the walker. How fast is the angle changing when the walker has walked 15 meters?



rates

$\frac{dP}{dt} = 4$

$\frac{dA}{dt} = ?$

$\frac{dD}{dt} = 0$

relationships

$\tan A = \frac{P}{D}$

values

$D = 20$

$P = 15$

$A = .6435$ $\quad \tan A = \frac{15}{20}$

$A = \tan^{-1}\left(\frac{15}{20}\right)$

$$\tan A = \frac{P}{20}$$

$$20 \tan A = P$$

$$20 \sec^2 A \frac{dA}{dt} = 1\frac{dP}{dt}$$

$$\frac{20\sec^2(.6435)\left(\frac{dA}{dt}\right)}{20\sec^2(.6435)} = \frac{4}{20\sec^2(.6435)}$$

$$\frac{dA}{dt} = .128 \text{ rad/sec}$$