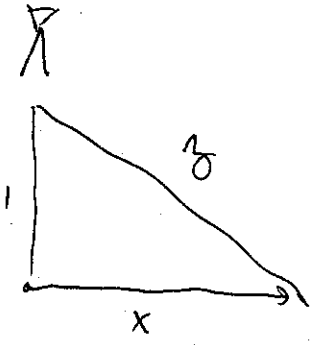
KEY

Math 125-Quiz 23
November 7, 2011

This quiz is due Wednesday at 9 AM. You may discuss the quiz with one another, and use your book and your notes. However, the work that you turn in should be your own, that is, no copying directly from or for your colleagues.

1. A ship traveling parallel to the coastline at 6 km/hr is passing by a tower on land. When the ship is closest to the tower, the tower is 1 kilometer from the ship. How fast is the distance between the tower and the ship changing 24 minutes later?



$\frac{dx}{dt} = 6$

$x^2 + 1 = z^2$ $\quad \frac{dz}{dt} = ?$

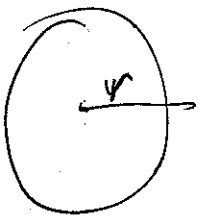
$2x\frac{dx}{dt} + 0 = 2z\frac{dz}{dt}$

$2(2.4)(6) = 2.6\frac{dz}{dt}$ @ 24 min.

$\frac{dz}{dt} = \frac{(2.4)(6)}{2.6}$ mi/hr $\quad x = 2.4$ mi

$z = 2.6$ mi

2. *A snowballs chance....* A spherical snowball is losing volume at a rate of 10 in.^{3}/hr. How fast is the radius shrinking when the radius is 18 inches? (Note: $V = \frac{4}{3}\pi r^3$ for the snowball).



$V = \frac{4}{3}\pi r^3$ $\quad \frac{dV}{dt} = -10$ in.^{3}/hr

$\frac{dV}{dt} = 4\pi r^2\frac{dr}{dt}$

$-10 = 4\pi(18)^2\frac{dr}{dt}$

$\frac{dr}{dt} = \frac{-10}{4\pi(18)^2}$