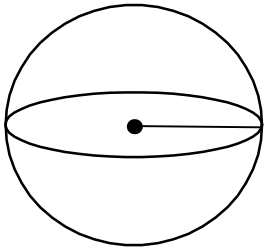
C12 - 4.4 - Sphere Tight Rope Notes



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

$\frac{dr}{dt}|_{SA=20} = 2$

$V = \frac{4}{3}\pi r^3$

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

$\frac{dV}{dt} = 4\pi\left(\sqrt{\frac{100}{4\pi}}\right)^2 \frac{dr}{dt}$

$\frac{dV}{dt} = 4\pi \times \frac{100}{4\pi} \times 2$

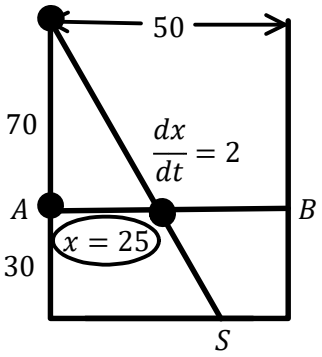
$\frac{dV}{dt} = 200\frac{m^3}{s}$

$SA = 4\pi r^2$

$100 = 4\pi(2)^2$

$r = \sqrt{\frac{100}{4\pi}}$

$r = \frac{10}{2\sqrt{\pi}}\ m$



$\frac{dS}{dt}|_{x=25} = ?$

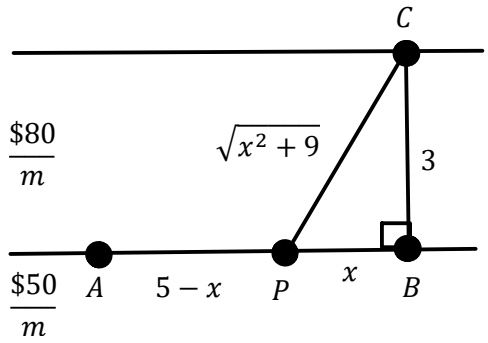
$\frac{x}{70} = \frac{S}{100}$

$x = \frac{7}{10}S$

$\frac{dx}{dt} = \frac{7}{10}\frac{dS}{dt}$

$2 = \frac{7}{10}\frac{dS}{dt}$

$\frac{dS}{dt} = \frac{20}{7}\frac{m}{s}$



$C = 50(5-x) + 80\sqrt{x^2+9}$

$C' =$

$0 =$

Number Line

$Cost = length \times \frac{cost}{length}$