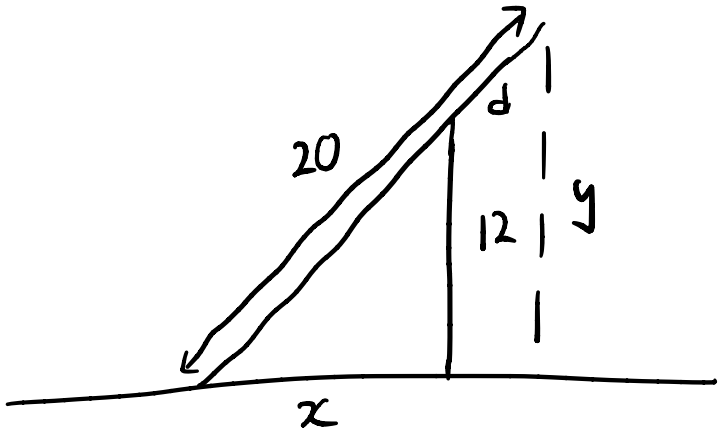
A 20ft ladder leans over a 12ft wall so that 5ft project over the wall. The bottom of the ladder is pulled away from the wall at 5ft/s. How quickly is the top of the ladder approaching the ground?

3/8/25



$x^2+12^2=15^2$ $\quad \frac{dx}{dt}=5\,ft/s$

$\Rightarrow x=9$

$\frac{20}{20-d}=\frac{y}{12}$

$\frac{-20}{(20-d)^2}\left(-\frac{d}{dt}d\right)=\frac{1}{12}\frac{dy}{dt}$

$\Rightarrow \frac{dy}{dt}=12\left(\frac{20}{15^2}(-3)\right)$

$=-12\left(\frac{4}{15}\right)$

$=-\frac{16}{5}$

$x^2+12^2=(20-d)^2$

$\Rightarrow 2x\frac{dx}{dt}+0=2(20-d)\left(-\frac{dd}{dt}\right)$

$2(9)(5)=2(20-5)\left(-\frac{dd}{dt}\right)$

$\Rightarrow \frac{dd}{dt}=-\frac{9\times5}{15}=-3$

$\frac{15}{12}=\frac{20}{y}$

$y=\frac{4}{20}\times\frac{12}{15}\,y$

$=16$