7.4 Related Rates I

Wednesday, June 12, 2019 7:14 AM

$y^2 + 4x^3 - 5 = 2x$

$2y\cdot\frac{dy}{dt} + 12x^2\cdot\frac{dx}{dt} + 0 = 2\cdot\frac{dx}{dt}$

$A = \pi r^2$

$1\cdot\frac{dA}{dt} = 2\pi r\cdot\frac{dr}{dt}$

$S = t^2 - 4t + 8$

$V = \frac{ds}{dt} = 2t - 4$

↑ rate of change of the position (height)

* Every time you take the derivative of a variable you must multiply by $\frac{d\_}{dt}$ ← (variable)

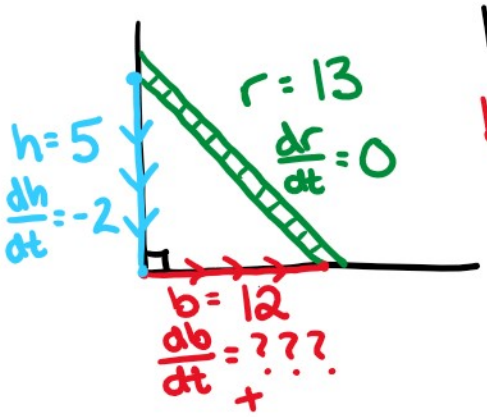
$\frac{dA}{dt}$ = rate of change of AREA

$\frac{dr}{dt}$ = rate of change of RADIUS

$\frac{dh}{dt}$ = rate of change of HEIGHT

Length	Rate of Change
Increasing	Positive
Constant	Zero
Decreasing	Negative

A 13-foot ladder is leaning against a wall. If the top of the ladder slips down the wall at a rate of 2 feet per second, how fast will the base be moving away from the wall when the top is 5 feet above the ground?



$b^2 + h^2 = r^2$ DERIVE → $2b\cdot\frac{db}{dt} + 2h\cdot\frac{dh}{dt} = 2r\cdot\frac{dr}{dt}$

$b^2 + 5^2 = 13^2$

$b = 12$

$2(12)\cdot\frac{db}{dt} + 2(5)\cdot(-2) = 2(13)(0)$

$24\frac{db}{dt} - 20 = 0$

$\frac{db}{dt} = \frac{20}{24} = \frac{5}{6} = 0.83$