2.6 B   Related Rates (Again)

A. A ladder 10 ft. long rests against a vertical wall. The bottom slides away at a rate of 1 ft/sec. How fast is the top sliding down when the bottom is 6 ft. away?

Ex.

a. $\dfrac{da}{dt}$

b. $\dfrac{db}{dt}, b$

c.

$a^2 + b^2 = c^2$

$a^2 + 6^2 = 10^2$

$a^2 = 64$

d. $a^2 + b^2 = c^2$

e. $2a\dfrac{da}{dt} + 2b\dfrac{db}{dt} = 2c\dfrac{dc}{dt}$

$\dfrac{da}{dt} = \dfrac{-2b\dfrac{db}{dt}}{2a}$

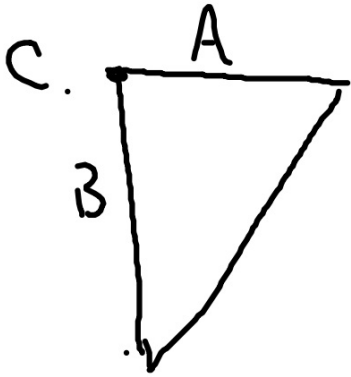$\dfrac{da}{dt} = \dfrac{-2(6)(1)}{2(8)}$

$= -\dfrac{3}{4} \text{ ft}/\text{sec}$

B. Car A goes W at $50^{mi}/hr$. Car B is going N at $60^{mi}/hr$. Both are headed towards an intersection. How quickly are they approaching each other when A is .3mi and B is .4 mi away?

a. $\dfrac{dc}{dt}$

b. $\dfrac{da}{dt}, a, \dfrac{db}{dt}, b$

c.

d. $a^2 + b^2 = c^2$

e. $\dfrac{2a\frac{da}{dt} + 2b\frac{db}{dt}}{2c} = \dfrac{2c\frac{dc}{dt}}{2c}$
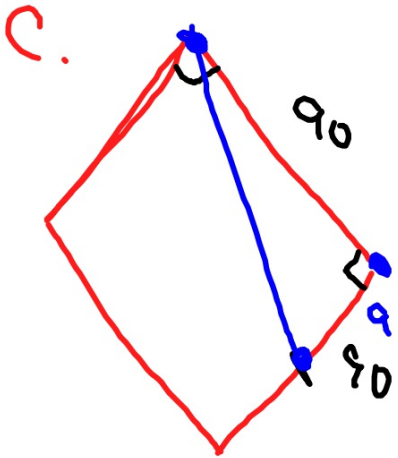
$= \dfrac{2(.3)(50) + 2(.4)(60)}{2(.5)}$

$= 78\ ^{mi}/_{hr}$

C. A baseball diamond is a square with sides of 90 ft. A batter runs to 1st base at 24 ft/sec. At what rate is his distance from 2B decreasing when he is halfway to 1B?

a. $\dfrac{dc}{dt}$

b. $\dfrac{da}{dt}, a$

c.

d. $a^2 + b^2 = c^2$

e. $\dfrac{2a\frac{da}{dt}}{2c} = \dfrac{2c\frac{dc}{dt}}{2c}$

$\dfrac{2(45)(24)}{2(100.623)} = 10.733 \text{ ft/sec}$

27a

28

30a

33

84