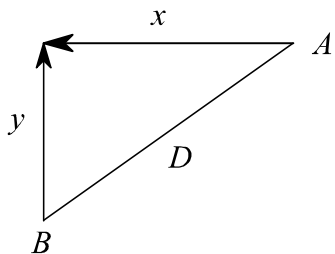


MATH 1101Y 2009 Quiz 6 (a)

1. (3 pts) Car A is traveling west at 40 km/h and car B is traveling north at 50 km/h. Both are headed for the intersection of the two roads. At what rate are the cars approaching each other when car A is 0.6 km and car B is 0.4 km from the intersection?

Solution:



Let the distance from car A to the intersection be x , the distance from car B to the intersection be y . Let the distance between the two cars be D . We are given that $\frac{dx}{dt} = 40$, $\frac{dy}{dt} = 50$. Since $D = \sqrt{x^2 + y^2}$,

$$\begin{aligned} \frac{dD}{dt} &= \frac{2x \frac{dx}{dt} + 2y \frac{dy}{dt}}{2\sqrt{x^2 + y^2}} \\ &= \frac{x \frac{dx}{dt} + y \frac{dy}{dt}}{\sqrt{x^2 + y^2}} \\ &= \frac{0.6 \cdot 40 + 0.4 \cdot 50}{\sqrt{0.6^2 + 0.4^2}} \\ &\approx 61.017 \end{aligned}$$

when $x = 0.6$ and $y = 0.4$. □

2. (2 pts) Find the derivative of $f(x) = \cosh(1 + \ln 2x)$.

Solution:

$$\begin{aligned} f'(x) &= \sinh(1 + \ln 2x) \cdot \frac{1}{2x} \cdot 2 \\ &= \frac{\sinh(1 + \ln 2x)}{x}. \end{aligned}$$

□