

$$f(x) = \sqrt{\frac{x}{x+5}} = \left(\frac{x}{x+5}\right)^{\frac{1}{2}}$$

$$\rightarrow f'(x) = \frac{1}{2} \left(\frac{x}{x+5}\right)^{-\frac{1}{2}} \left(\frac{1 \cdot (x+5) - x \cdot 1}{(x+5)^2}\right)$$

$$(xy)' = x'y + xy' = y + xy', \text{ b/c}$$

$$\frac{d}{dx}[x] = 1$$

$$(fg)' = f'g + fg'$$

$$h(x) = x\sqrt{25-x^2} = x(25-x^2)^{\frac{1}{2}}$$

f · g

$$\Rightarrow h'(x) = 1(25-x^2)^{\frac{1}{2}} + x\left(\frac{1}{2}(25-x^2)^{-\frac{1}{2}}(-2x)\right) \text{ STOP!}$$

To clean it up;

$$= \frac{\sqrt{25-x^2}}{1} \cdot \frac{\sqrt{25-x^2}}{\sqrt{25-x^2}} + \frac{x^2}{\sqrt{25-x^2}}$$

$$= \frac{25-x^2+x^2}{\sqrt{25-x^2}} = \frac{25}{\sqrt{25-x^2}} = \frac{2\sqrt{25-x^2}}{25-x^2} \text{ in simplified form.}$$

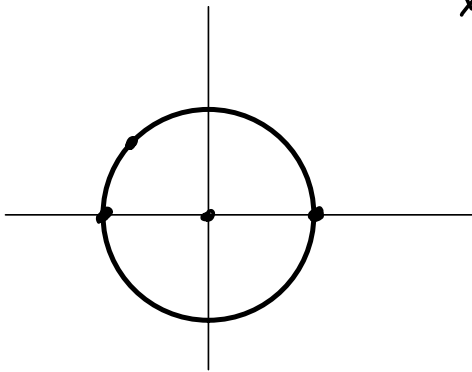
$$x^2 y^3 + \sin(xy) = (y^2 - 5)^{\frac{2}{3}} \rightarrow$$

$$2xy^3 + x^2(3y^2)y' + \cos(x)(y + xy') = \frac{2}{3}(y^2 - 5)^{-\frac{1}{3}}(2yy')$$

$$2xy^3 + 3x^2y^2y' + y\cos(x) + \cos(x)y' = \frac{4y}{3(y^2 - 5)^{\frac{1}{3}}}y'$$

$$3x^2y^2y' + \cos(x)y' - \frac{4y}{3(y^2 - 5)^{\frac{1}{3}}}y' = -2xy^3 - y\cos(x)$$

$$y' = \frac{-2xy^3 - y\cos(x)}{3x^2y^2 + \cos(x) - \frac{4y}{3(y^2 - 5)^{\frac{1}{3}}}}$$



$x =$ the # of miles from home

^
^
^

$$x = 7 \text{ mi}$$