Wednesday, September 18

What rule do you need to use to take the derivative when multiplying two functions? Why?

What rule do you need to use to take the derivative when dividing two functions? Why?

September 18

Students will verbally explain how to find the derivative

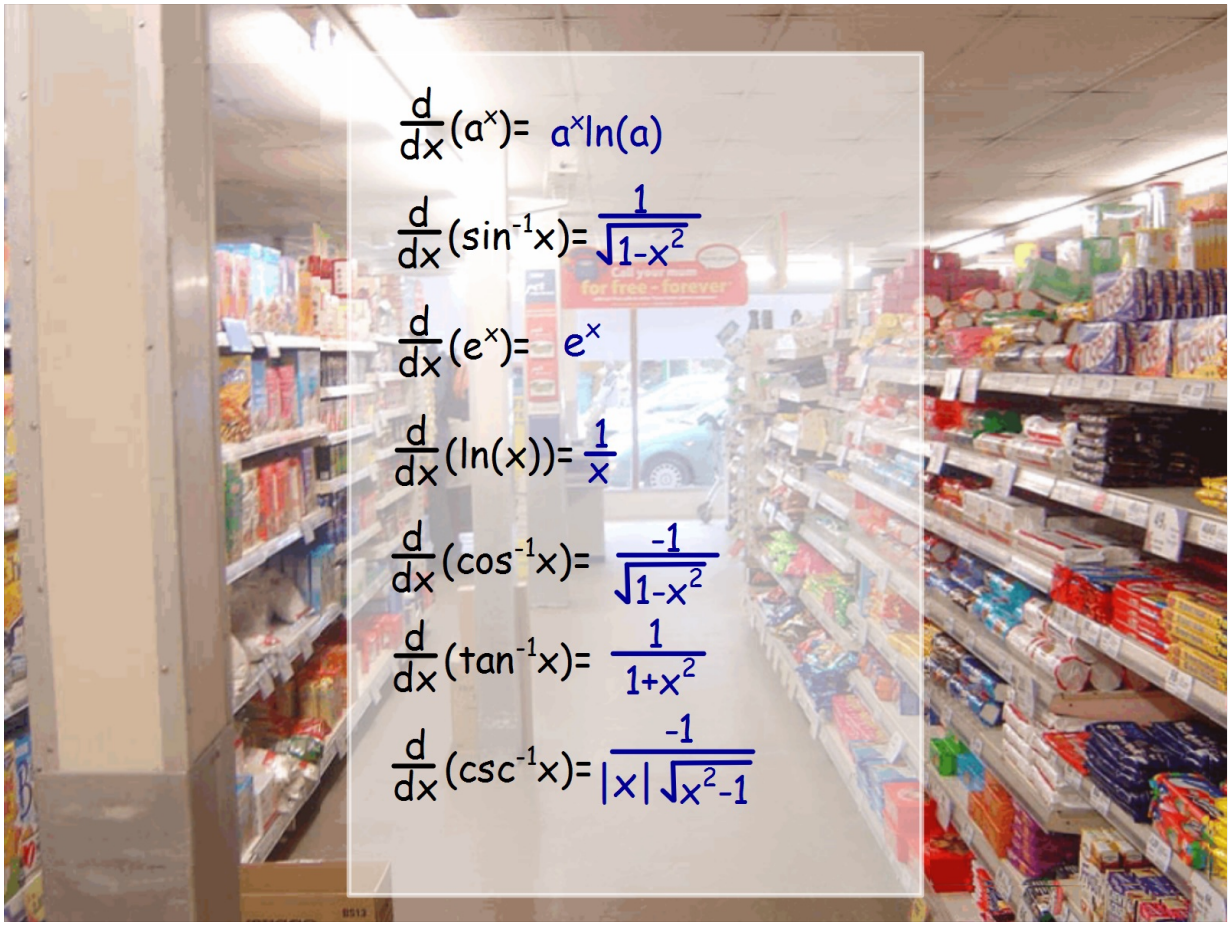
(using the words:
function, exponent, coefficient...)

$$f(x)=\frac{(9x^2+12x-\sqrt{x})(15-\frac{1}{x})}{x^3-7x^4}$$

find $f'(x)$

$$f(x)=\frac{(9x^2+12x-x^{1/2})(15-x^{-1})}{(x^3-7x^4)}$$

$$f'(x)=\frac{[(18x+12-\frac{1}{2}x^{-1/2})(15-x^{-1})+(0-(-1x^{-2}))(9x^2+12x-x^{1/2})](x^3-7x^4)-(3x^2-28x^3)(9x^2+12x-x^{1/2})(15-x^{-1})}{(x^3-7x^4)^2}$$



$$\frac{d}{dx}(a^x)=a^x\ln(a)$$

$$\frac{d}{dx}(\sin^{-1}x)=\frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx}(e^x)=e^x$$

$$\frac{d}{dx}(\ln(x))=\frac{1}{x}$$

$$\frac{d}{dx}(\cos^{-1}x)=\frac{-1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx}(\tan^{-1}x)=\frac{1}{1+x^2}$$

$$\frac{d}{dx}(\csc^{-1}x)=\frac{-1}{|x|\sqrt{x^2-1}}$$

#1, 2, 7-31 (odd, part a only) 33-36, 37, 39, 41, 54, 57-60, 61 74-79

DERIVATIVES

power rule: $\frac{d}{dx}(x^n) = nx^{n-1}$

sum & difference: $\frac{d}{dx}(f(x) \pm g(x)) = f'(x) \pm g'(x)$

product rule: $\frac{d}{dx}(f(x)g(x)) = f'(x)g(x) + f(x)g'(x)$

quotient rule: $\frac{d}{dx}\left[\frac{f(x)}{g(x)}\right] = \frac{f(x)g(x) - g'(x)f(x)}{g(x)^2}$

chain rule: $\frac{d}{dx}(f(g(x))) = f'(g(x))g'(x)$

$\frac{d}{dx}(\sin x) = \cos x$

$\frac{d}{dx}(\cos x) = -\sin x$

$\frac{d}{dx}(\tan x) = \sec^2 x$

$\frac{d}{dx}(\cot x) = -\csc^2 x$

$\frac{d}{dx}(\sec x) = \sec x \tan x$

$\frac{d}{dx}(\csc x) = -\csc x \cot x$

$\frac{d}{dx}(\ln x) = \frac{1}{x}$

$\frac{d}{dx}(\log_b x) = \frac{1}{\ln(b)\, x}$

$\frac{d}{dx}(e^x) = e^x$

$\frac{d}{dx}(a^x) = a^x \ln(a)$

$\frac{d}{dx}(\arcsin x) = \frac{d}{dx}(\sin^{-1} x) = \frac{1}{\sqrt{1-x^2}}$

$\frac{d}{dx}(\arccos x) = \frac{-1}{\sqrt{1-x^2}}$

$\frac{d}{dx}(\arctan x) = \frac{1}{1+x^2}$

$\frac{d}{dx}(\operatorname{arccot} x) = \frac{-1}{1+x^2}$

$\frac{d}{dx}(\operatorname{arcsec} x) = \frac{1}{|x|\sqrt{x^2-1}}$

$\frac{d}{dx}(\operatorname{arccsc} x) = \frac{-1}{|x|\sqrt{x^2-1}}$