

$$f(x) = \sqrt[3]{\sin^2(\ln(4x^9))} \quad (a^m)^n = a^{mn}$$

$$= \left[(\sin(\ln(4x^9)))^2 \right]^{1/3}$$

$$= \left[\sin(\ln(4x^9)) \right]^{2/3}$$

$$f'(x) = \frac{2}{3} \left[\sin(\ln(4x^9)) \right]^{-1/3} \cdot \cos(\ln(4x^9)) \cdot \frac{1}{4x^9} \cdot 36x^8$$

$$f(x) = 5 \sqrt[3]{4 \log_2(3x^2 - 4x)}$$

$$= 5 (4 \log_2(3x^2 - 4x))^{1/3}$$

$$f'(x) = 5 \cdot \ln 5 \cdot \frac{1}{3} (4 \log_2(3x^2 - 4x))^{-2/3} \cdot 4 \cdot \frac{1}{(3x^2 - 4x) \ln 2} \cdot (6x - 4)$$

$$[x^n]' = nx^{n-1}$$

$$[cf(x)]' = c \cdot f'(x)$$

$$[f(x) \pm g(x)]' = f'(x) \pm g'(x)$$

$$[f(x)g(x)]' = f'g + fg'$$

$$\left[\frac{f(x)}{g(x)} \right]' = \frac{gf' - fg'}{g^2}$$

$$[f(g(x))]' = f'(g(x)) \cdot g'(x)$$

$$[e^x]' = e^x$$

$$[a^x]' = a^x \ln a$$

$$[\ln x]' = \frac{1}{x}$$

$$[\log_a x]' = \frac{1}{x \ln a}$$

$$[\sin x]' = \cos x$$

$$[\cos x]' = -\sin x$$

$$[\tan x]' = \sec^2 x$$

$$[\cot x]' = -\csc^2 x$$

$$[\sec x]' = \sec x \tan x$$

$$[\csc x]' = -\csc x \cot x$$

$$[\arcsin x]' = \frac{1}{\sqrt{1-x^2}}$$

$$[\arctan x]' = \frac{1}{x^2 + 1}$$

$$[\operatorname{arcsec} x]' = \frac{1}{|x| \sqrt{x^2 - 1}}$$

$$[\arccos x]' = -\frac{1}{\sqrt{1-x^2}}$$

$$[\operatorname{arccot} x]' = -\frac{1}{x^2 + 1}$$

$$[\operatorname{arccsc} x]' = -\frac{1}{|x| \sqrt{x^2 - 1}}$$

$$\arcsin x = \sin^{-1} x$$

$$\neq \frac{1}{\sin x}$$

2.4 The Chain Rule, cont.

$$18. f(x) = -3\sqrt[4]{2-9x} = -3(2-9x)^{1/4}$$

$$(a+b)^2 \neq a^2+b^2 \\ = a^2+2ab+b^2$$

$$f'(x) = -3 \cdot \frac{1}{4} (2-9x)^{-3/4} \cdot (-9) = \frac{27}{4\sqrt[4]{(2-9x)^3}}$$

$$32. h(t) = \left(\frac{t^2}{t^3+2}\right)^2$$

$$h'(t) = 2 \left(\frac{t^2}{t^3+2}\right) \cdot \frac{(t^3+2)(2t) - (t^2)(3t^2)}{(t^3+2)^2}$$

$$50. h(x) = \sec x^2 = \sec(x^2)$$

$$h'(x) = (\sec x^2)(\tan x^2) \cdot 2x$$

$$60. g(t) = 5 \cos^2 \pi t = 5 [\cos(\pi t)]^2$$

$$\cos^2 x = (\cos x)^2$$

$$g'(t) = 10 \cos \pi t \cdot (-\sin \pi t) \cdot \pi$$

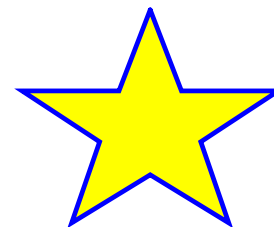
$$66. y = \sin \sqrt[3]{x} + \sqrt[3]{\sin x} = \sin(x^{1/3}) + (\sin x)^{1/3}$$

$$y' = \cos(x^{1/3}) \cdot \frac{1}{3} x^{-2/3} + \frac{1}{3} (\sin x)^{-2/3} \cdot \cos x$$

5.4

$$46. g(t) = e^{-3/t^2} = e^{-3t^{-2}}$$

$$g'(t) = e^{-3t^{-2}} \cdot 6t^{-3}$$

Homework for Test #2 on DerivativesHW #4 (submitted Fri 12/05)

- 2.1 #1-23 odd Find the derivative by the limit process
- #29-32 all find the equation of the tangent line
- #61-69 odd Use the alternate form to find the derivative
- #71-79 odd Describe x-values where the function is differentiable (given graph)
- 2.2 #3-51 odd Find the derivative using the basic derivative rules
- #91-94 all; 101, 102 use the derivative to solve rate of change word problems

HW #5 (due Fri 12/12)

- 2.3 #1-53 odd, 63-69 odd, Product and quotient rules
75-81 all, 83-91 odd,
109-115 all
- 2.4 #7-33 odd, #47-81 odd Chain rule
- 5.1 #45-61, 71 Logarithmic functions
- 5.4 #39-57 Exponential functions
- 5.5 #41-55 Log and exp functions with other bases
- 5.8 #41-59 Inverse trig functions