

Homework 7

section 3.1

4) Differentiate $f(x) = (x^2 + x + 1)^3(x-1)^4$

$$f'(x) = \left(\frac{d}{dx}(x^2+x+1)^3\right)(x-1)^4 + (x^2+x+1)^3\left(\frac{d}{dx}(x-1)^4\right)$$
$$= 3(x^2+x+1)^2(2x+1)(x-1)^4 + (x^2+x+1)^3(4(x-1)^3(1))$$

20) Differentiate $y = \frac{(x+1)^3}{(x-5)^2}$

$$\frac{dy}{dx} = \frac{(x-5)^2 \frac{d}{dx}(x+1)^3 - (x+1)^3 \frac{d}{dx}(x-5)^2}{((x-5)^2)^2} \quad *$$
$$= \frac{(x-5)^2(3(x+1)^2(1)) - (x+1)^3(2(x-5)(1))}{((x-5)^2)^2}$$

26) Differentiate $y = \sqrt{\frac{x+3}{x^2+1}}$

$$y = \sqrt{\frac{x+3}{x^2+1}} = \left(\frac{x+3}{x^2+1}\right)^{1/2}$$
$$\frac{dy}{dx} = \frac{1}{2} \left(\frac{x+3}{x^2+1}\right)^{-1/2} \frac{d}{dx} \left(\frac{x+3}{x^2+1}\right)$$
$$= \frac{1}{2} \left(\frac{x+3}{x^2+1}\right)^{-1/2} \left(\frac{(x^2+1) \frac{d}{dx}(x+3) - (x+3) \frac{d}{dx}(x^2+1)}{(x^2+1)^2}\right)$$
$$= \frac{1}{2} \left(\frac{x+3}{x^2+1}\right)^{-1/2} \left(\frac{(x^2+1)(1) - (x+3)(2x)}{(x^2+1)^2}\right)$$

section 4.1

22) Solve for x : $2^{4-x} = 8$

$$2^{4-x} = 2^3 \Rightarrow 4-x = 3 \Rightarrow -x = -1 \Rightarrow \boxed{x=1}$$

section 4.4

16) simplify $\ln(e^{-2}e^4)$

$$\ln(e^{-2}e^4) = \ln(e^{-2+4}) = \ln(e^2) = \boxed{2} \quad *$$

30) solve for x : $2\ln x = 7$

$$\ln x = \frac{7}{2} \Rightarrow \boxed{x = e^{7/2}}$$

section 4.6

24) solve for x : $\ln\sqrt{x} - 2\ln 3 = 0$

$$\ln\sqrt{x} - 2\ln 3 = 0 \Rightarrow \ln\sqrt{x} = 2\ln 3 \Rightarrow \ln\sqrt{x} = \ln 3^2 \Rightarrow \ln\sqrt{x} = \ln 9 \Rightarrow \sqrt{x} = 9 \Rightarrow \boxed{x=81} \quad *$$

classwork graded: Cw 10 #1a,1e cw 11 #2b, #3b, #3d