QUIZ 4 SOLUTIONS

(1) (10 pts) Using the power rule, we have

$$\frac{d}{dx}\left[x^7+3x^2+1\right]=7x^6+6x$$

(2) (10 pts) Using the power rule and the rules we have for evaluating derivatives of trigs, we have

$$\frac{d}{dx}\left[\sqrt{x}+\sin(x)\right]=\frac{1}{2\sqrt{x}}+\cos(x)$$

(3) (10 pts) Using the rules we have for evaluating derivatives of trigs, we have

$$\frac{d}{dx}\left[\tan(x)\right]=\sec^2(x)$$

(4) (10 pts) Using the rules we have for evaluating derivatives of exponentials, we have

$$\frac{d}{dx}\left[2^x\right]=\ln(2)2^x$$

(5) (10 pts) Using the rules for evaluating derivatives of exponentials and trigs, together with the power rule, we have

$$\frac{d}{dx}\left[\frac{1}{x}+e^x+\cos(x)\right]=-\frac{1}{x^2}+\sin(x)$$

(6) (10 pts) Using the product rule twice (and our other derivative rules), we have

$$\frac{d}{dx}\left[x^2e^x+xe^x\right]=x^2e^x+2xe^x+xe^x+e^x$$

(7) (10 pts) Using the product rule, we have

$$\frac{d}{dx}\left[\sin(x)\cos(x)\right]=\sin(x)(-\sin(x))+\cos(x)\cos(x)=\cos^2(x)-\sin^2(x)$$

(8) (10 pts) The quotient rule gives

$$\frac{d}{dx}\left[\frac{x^3+1}{e^x-x}\right]=\frac{(e^x-x)(3x^2)-(x^3+1)(e^x-1)}{(e^x-x)^2}$$

(9) (10 pts) The chain rule gives

$$\frac{d}{dx}\left[\sqrt{\sec(x)}\right]=\frac{1}{2\sqrt{\sec(x)}}\ \sec(x)\tan(x)=\frac{\sec(x)\tan(x)}{2\sqrt{\sec(x)}}$$

(10) (10 pts) The chain rule tells us

$$\frac{d}{dx}\left[(x^2+x)^7\right]=7(x^2+x)^6(2x+1)$$