Math 1550 Section 20
Practice Test 2

Formulas: (I will give you the formulas for the derivatives of inverse trigonometric and inverse hyperbolic functions; the trigonometric and hyperbolic functions themselves you should know or be able to quickly derive.)

1. Compute the derivative of $x^2x^4x^{10}$ using the product rule. Show all your steps.

2. Let $f(x) = \dfrac{x^2+5x+6}{(x+1)e^x}$. Compute $f'(x)$.

3. What is the 58th derivative of e^{2x}?

4. Write a general formula for the derivative of $f\big(g(x)h(x)\big)$ using the chain and product rules.

5. Let $f(x) = \sin\left(e^{\sin x} + \sin(e^x)\right)$. Find $f'(x)$.

6. Let $f(x) = \big(\cos x\big)^{\cos x}$. Find $f'(x)$.

7. Suppose $x^y = \ln x$. Find $\dfrac{dy}{dx}$.

8. The edge length of a cube is increasing at 2 cm/s. If the volume of the cube is 8 cm^3 when $t = 0$ seconds, how fast is the volume increasing when $t = 3$ seconds?

9. The volume of a spherically-shaped boy is given by the function $8 + 3(1 - e^{-t})$, measured in cubic feet. How fast is his radius increasing when his volume is 10 cubic feet?

BONUS: Find the derivative of x^{x^x}.