Sample Exam #2 Answers
Math 150–Hughes

1. a) $f'(x) = 2e^{2x}\sin 3x + 3e^{2x}\cos 3x$

   b) $g'(x) = 2(\operatorname{sech} x)(-\operatorname{sech} x\ \tanh x)$

   c) $h'(x) = \dfrac{7}{x} + \ln 2 - \dfrac{1}{2}\cdot\dfrac{2x}{x^2+9}$

   d) $p'(x) = 3x^2e^{-x^2} + x^3e^{-x^2}(-2x)$

   e) $q'(x) = \dfrac{(x^3+1)^{1/2} - (x+1)(\frac{1}{2})(x^3+1)^{-1/2}3x^2}{x^3+1}$

2. $f''(x) = \dfrac{1}{\sqrt{1-x^2}}$

3. $\dfrac{1}{3}$

4. $\dfrac{dy}{dx} = -\dfrac{\sec^2(x+y) + y^3}{\sec^2(x+y) + 3xy^2}$

5. $y = 2x - 4$

6. $\dfrac{dy}{dx} = \dfrac{2\ln x}{x}\cdot x^{\ln x}$

7. a) $(f\cdot g)'(3) = -10$

   b) $(f\circ g)'(3) = 32$

8. a) $dy = \dfrac{x}{\sqrt{x^2+9}}\,dx.$

   b) 0.24

9. The height is increasing at the rate of $\dfrac{8}{3\pi}\ \dfrac{\text{ft}}{\text{min}}$.