Name: _____ _____ / **25**

Please circle your section: 901 (Gossell) 902 (Gossell) 903 (Graves-McCleary)

No aids (book, calculator, etc.) are permitted. **Show all work for full credit.**

1. [12 points] Find $\frac{dy}{dx}$ for each expression. You do not have to simplify.

a. $y = \sec(2x) + \tan(x^2)$

b. $y = (\cos(4-3x))^8$

c. $y = \csc(x)\cot(x)$

d. $y = \dfrac{12\sin(x)}{\sqrt{x^3-4x^2}}$

2. [5 points] Suppose the function $h(x)$ is defined in terms of two other functions, $f(x)$ and $g(x)$, as follows:

$$h(x) = (f(x))^3 - g\left(x^2\right).$$

Find $\mathbf{h'(1)}$, given that $f(1) = 2$, $f'(1) = 3$, $g(1) = 4$, and $g'(1) = 5$.

3. [8 points] Given the function $r(x) = (x^2 - 10x + 9)^5$.

a. Find $r'(x)$ using the chain rule.

b. Find all x-values when the tangent line to $r(x)$ is **horizontal**.