1. Differentiate: For part (c), assume that y **is a function of** x [ie. $y = y(x)$].

(a). $F(x) = (f(x))^3$ **(b).** $F(x) = (y(x))^3$ **(c).** $F(x) = y^3$

(d). Is there any difference between parts (a)-(c)?

2. Differentiate: For part (c), assume that y **is a function of** x [ie. $y = y(x)$].

(a). $F(x) = x^2 + (f(x))^2$ **(b).** $F(x) = x^2 + (y(x))^2$ **(c).** $F(x) = x^2 + y^2$

(d). Is there any difference between parts (a)-(c)?

3. Differentiate: For part (c), assume that y **is a function of** x [ie. $y = y(x)$].

(a). $F(x) = f(x) \cdot \sin x$ **(b).** $F(x) = y(x) \cdot \sin x$ **(c).** $F(x) = y \cdot \sin x$

(d). Is there any difference between parts (a)-(c)?

4. Differentiate: For part (c), assume that y **is a function of** x [ie. $y = y(x)$].

(a). $F(x) = \sqrt{f(x)}$ **(b).** $F(x) = \sqrt{y(x)}$ **(c).** $F(x) = \sqrt{y}$

(d). Is there any difference between parts (a)-(c)?

5. Assume that you know y **is a function of** x, [i.e. $y = y(x)$] but you are not given the function y. Find the following derivatives, using the **chain rule** as necessary. Your answers *may* contain y or $\frac{dy}{dx}$.

(a). $\dfrac{d}{dx}\left[x\right]$

(b). $\dfrac{d}{dx}\left[y\right]$ [Don't over think this one.]

(c). $\dfrac{d}{dx}\left[x^{1/2}\right]$

(d). $\dfrac{d}{dx}\left[y^{1/2}\right]$

(e). $\dfrac{d}{dx}\left[x^3\right]$

(f). $\dfrac{d}{dx}\left[y^3\right]$

(g). $\dfrac{d}{dx}\left[x^n\right]$

(h). $\dfrac{d}{dx}\left[y^n\right]$

(i). $\dfrac{d}{dx}\left[\sin x\right]$

(j). $\dfrac{d}{dx}\left[\sin y\right]$

(k). $\dfrac{d}{dx}\left[x + y\right]$

(l). $\dfrac{d}{dx}\left[x^2 + y^2\right]$

For the following, use the Product or Quotient Rule and previous results

(m). $\dfrac{d}{dx}\left[xy\right]$

(n). $\dfrac{d}{dx}\left[x^2y^3\right]$

(o). $\dfrac{d}{dx}\left[\dfrac{x}{y}\right]$

(p). $\dfrac{d}{dx}\left[\dfrac{y^2}{x^2}\right]$

(q). $\dfrac{d}{dx}\left[y \sin x\right]$

(r). $\dfrac{d}{dx}\left[x \sin y\right]$