

## Calculus I - Math 124 Exam #2 Review Problems

- Which Rule?

1.  $\frac{d}{dx} \left[ \frac{x}{\sin \frac{\pi}{4}} \right]$
2.  $\frac{d}{dx} [\pi \sin(x^4)]$
3.  $\frac{d}{dx} [(\sin x)^{\pi/4}]$
4.  $\frac{d}{dx} [(\sin \frac{\pi}{4})^x]$
5.  $\frac{d}{dx} [x^{\sin x}]$

- Chain Rule!!!

1.  $\frac{d}{dr} [\cos 2^r]$
2.  $g(x) = \sqrt{5^{3x^2+x}} \rightarrow g'(x) = ?$
3.  $\frac{d}{d\theta} [\sec(\tan \theta) + 5\theta]$
4.  $h(x) = \frac{e^{-1/x}}{2x} + 1 \rightarrow h'(x) = ?$
5.  $\frac{d}{dx} [3(\arcsin 2x)^5]$

- Fun with logs

1.  $\frac{d}{d\theta} [\ln(\sin \theta)]$
2.  $\frac{d}{dz} [2\ln(1 + e^z + \sqrt[4]{z})]$
3. Find the slope of  $f(x) = \ln(xe^x)$  when  $x = 2$ .
4.  $\frac{d}{d\theta} [(\sec \theta)^{2\theta}]$
5.  $\frac{dy}{dx} = ?$  when  $y = x^2 \log_3 x$

- Potpourri

1. Find the velocity at 1 second if  $s = f(t) = 4t^5 + 5t^3 - t + 2$  in meters at  $t$  seconds.
2.  $\frac{d}{dx} [\ln(\sin \frac{\pi}{2})]$
3. Find  $\frac{dy}{dx}$  for the curve  $\frac{y}{\cos x} + 4y^2 = 18 + x$  at the point  $(0, 2)$ .
4. Find  $\frac{dy}{dx}$  for the curve  $x^2y + \arctan x = \frac{\pi}{2}$  at the point  $(1, \frac{\pi}{4})$ .
5. Find an equation of the tangent line of  $g(x) = \frac{3+e^x}{4x-3}$  at the point  $(0, -\frac{4}{3})$ .