

Worksheet 12, Tuesday, April 17th, 2018**Derivatives** Compute each of the following derivatives.

1. $f'(x)$ where $f(x) = \frac{1}{\sqrt{\ln x}} + \frac{1}{\ln \sqrt{x}} + e^{\sqrt{\ln x}} + \frac{1}{e^{\sqrt{x}}} + \frac{1}{e^x + \ln x} + \frac{e^x}{\ln x}$ Do not simplify.

2. $\frac{d}{dx}(\sec x)^x$

3. $\frac{dy}{dx}$, if $ye^{\ln y} + \sin^2 x = \ln 5 + e^{xy}$.

4. y' where $y = \left(\frac{\sqrt{1-x} e^{\sec^2 x}}{(x \sin x)^{\frac{6}{7}}} \right)$ Do not simplify the final answer.

Integration Compute each of the following integrals:

5. $\int \frac{(x\sqrt{x} - 5)(1 + \sqrt{x})}{x^3} dx$

6. $\int_{e^3}^{e^8} \frac{8}{x\sqrt{1 + \ln x}} dx$

7. $\int_0^{\ln 2} \frac{e^{2x} - e^{-2x}}{(e^x + e^{-x})^2} dx$ hint: try a combination of algebra **and** u-substitution

8. $\int_0^{\frac{\pi}{6}} \frac{\sec^2(2x)}{1 + \tan(2x)} dx$

9. $\int_0^{\frac{\pi}{3}} \frac{\sin x}{\cos^2 x e^{\sec x}} dx$

10. Find the equation of the tangent line to

$$y = \ln(1 + \cos x) - e \cos(\ln(1 + x)) + e^{1 + \ln(1+x)} + (\sin x)e^{\cos x}$$

at the point where the x -coordinate is 0.**Turn in your own solutions.**