There are 11 problems with 10 points each

1. Find f '(x):   a) $f(x) = \ln \sqrt{\dfrac{x^3 - 1}{\tan x}}$

b) $f(x) = (3 - e^{\sqrt{x}})^4 (3^x + 5^x)$

2. Find the equation of the tangent line to the curve $y = \dfrac{\sin^{-1} x}{x^2}$ at the point $(1, \pi/2)$.

3. Evaluate: a) $\int_0^1 x \; e^{-x^2} dx =$ _____

b) $\int \dfrac{2-x}{3-x^2} dx =$ _____

4. Find dy/dx: $\ln xy = 2 - e^{xy}$

5. Integrate using trigonometric substitution: $\displaystyle\int \frac{\sqrt{9-x^2}}{x}\,dx$

6. Find the numerical value of each expression.

a) $\cosh^{-1}(0) = $_____

b) $\cosh(\ln 2) = $_____

c) $\log_2 8\sqrt{2} = $_____

d) $e^{(\ln 5 - 2\ln 2)} = $_____

e) $\tan(\arcsin(0.3)) = $_____

7. Evaluate using integration by parts:

a) $\int \tan^{-1} t \, dt = $ _____

b) $\int_0^1 e^{2x} \cos 3x \, dx = $ _____

8. Find the following limits. Use L'Hospital's Rule where appropriate.

a) $\lim\limits_{x \to 0^+} x^2 \ln x$ = _____

b) $\lim\limits_{x \to \infty} \left(\dfrac{x-2}{2x+1} \right)^x$ = _____

9. Use logarithmic differentiation to find the derivative for $f(x) = \left(\dfrac{x+2}{x-3} \right)^x$

10. Evaluate the integral.
$$\int_0^{\pi/3} \tan^5 x \sec^4 x \, dx$$

11. Evaluate: a) $\int \sin^3 x \cos^2 x \, dx$ = _____

b) $\int \dfrac{\sec^2(\ln x)}{x} \, dx$ = _____