

Name: _____

Please show all work and box the answers, where appropriate.

1. (10 pts.) Differentiate the following functions:

(a) $\ln(x^2 + \cosh(x^2))$ (b) $e^{\arctan(x^3)}$ (c) $\log_3(x^4 + 1)$ (d) 3^{x^2+1} (e) $(x^2 + 1)^x$

2. (10 pts.) Evaluate the following integrals:

(a) $\int 3^{3x} dx$ (b) $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$ (c) $\int 2^{x+2^x} dx$ (d) $\int \cot(x) dx$ (e) $\int \frac{e^x}{\sqrt{1 - e^{2x}}} dx$

3. (10 pts.) Evaluate the following integrals:

(a) $\int x\sqrt{x+2} dx$ (b) $\int \frac{\sqrt{x^2-1}}{x^3} dx$

4. (10 pts.) Sketch the following functions:

(a) $y = \log_2(x)$ (b) $y = \log_{\frac{1}{2}}(x)$

5. (10 pts.) Evaluate the following limits:

(a) $\lim_{x \rightarrow \infty} \arctan(e^x)$ (b) $\lim_{x \rightarrow -\infty} \arctan(e^x)$

6. (10 pts.) Let
- R
- be the region in the plane bounded by the
- x
- axis and
- $y = \cos(x)$
- ,
- $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$
- . Find the volume of the solid formed by rotating
- R
- around the
- x
- axis. Sketch.

1	2	3	4	5	6	total (60)	%