

Name: _____

1. Differentiate or Integrate as indicated. Quick, quick! These should be ingrained!

a. $\frac{d}{dx}(\ln(x))$

f. $\int \frac{1}{x} dx$

b. $\frac{d}{dx}(\cos(x))$

g. $-\int \sin(x) dx$

c. $\frac{d}{dx}(xe^{-i\pi})$

h. $\int e^{-i\pi} dx$

d. $\frac{d}{dx}(e^{-\pi x})$

i. $-\pi \int e^{-\pi x} dx$

e. $\frac{d}{dx}(\arctan(x))$

j. $\int \frac{1}{1+x^2} dx$

2. Simplify $z = \frac{e^{i\pi} + e^{-i\pi}}{2}$.

3. Given the parametric equations $x(t) = \cos(2\pi t)$ and $y(t) = 2 \sin(2\pi t)$, the graph of this parametric curve in the xy -plane is a what? Give some detail in your description.

4. Use the identity for the sine of a sum or difference to determine the exact value of $\sin\left(\frac{\pi}{12}\right)$.

5. What is the limit, as $t \rightarrow \infty$, of $e^{i \arctan(t)}$?

6. Given that $s > 2$, evaluate the improper integral $F = \int_0^\infty e^{(2-s)t} dt$.