

Honors Math 182 Quiz 8 Version A

1. Find $\int \frac{x+3}{x^2+9} dx$.

2. Use integration by parts to prove Taylor's Theorem: Let f be $n+1$ times continuously differentiable. Then

$$f(b) = f(a) + (b-a)f'(a) + \frac{(b-a)^2}{2!}f''(a) + \frac{(b-a)^3}{3!}f'''(a) + \cdots \\ + \frac{(b-a)^n}{n!}f^{(n)}(a) + \int_a^b \frac{(b-t)^n}{n!}f^{(n+1)}(t) dt.$$

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3. State from memory or derive if necessary the following Taylor series:

(i) The Taylor series for $f(x) = e^x$ when $a = 0$ and $b = x$.

(ii) The Taylor series for $f(x) = \sin x$ when $a = 0$ and $b = x$.

(iii) The Taylor series for $f(x) = \arctan x$ when $a = 0$ and $b = x$.

4. Find $\int x \cos(2x) dx$.