

Exam 2A

MATH 230, FALL 2015

Name:

Directions: Show ALL work for full credit. No calculators allowed.

1. True or False: The partial fraction decomposition for the following functions are as given below. If false, justify your reasoning. (12 pts)

a) $\frac{x(x^2 + 4)}{x^2 - 4} = \frac{A}{x + 2} + \frac{B}{x - 2}$ T F

b) $\frac{x^2 + 4}{x(x^2 - 4)} = \frac{A}{x} + \frac{B}{x + 2} + \frac{C}{x - 2}$ T F

c) $\frac{x^2 + 4}{x^2(x - 4)} = \frac{A}{x^2} + \frac{B}{x - 4}$ T F

2. Set up integration by parts for the integral $\int z^3 e^z dz$, what you should choose for u and dv ? Explain your answer. (10 pts)

3. Calculate the limits. (21 pts)

a) $\lim_{x \rightarrow 0} \frac{\sin^{-1}(x)}{x}$

b) $\lim_{x \rightarrow \infty} \frac{\ln(2 + e^x)}{3x}$

c) $\lim_{x \rightarrow \infty} x^{1/x}$

4. Calculate the derivative of $f(x) = 3^{x^2} \tan^{-1}(x^2)$. (7 pts)

5. Evaluate the integral (the best 5 will be graded). (50 pts)

a) $\int \frac{dx}{1+9x^2}$

b) $\int \frac{x+2}{x^2+3x-4} dx$

c) $\int \tan^2(\theta) \sec^4(\theta) d\theta$

d) $\int 3^{\sin(\theta)} \cos(\theta) d\theta$

e) $\int \frac{1}{x^2\sqrt{9-x^2}} dx$

f) $\int \ln(x+3) dx$

Extra Credit Prove that $e = \lim_{n \rightarrow \infty} (1 + \frac{1}{n})^n$.