

Name: _____

1. Write the general FORM of the complete partial-fractions decomposition of the function

10 pts

$$\frac{x^5 + 3x^2 + 12}{(x^2 + 2)^2(x^2 - 1)}.$$

DO NOT DETERMINE THE CONSTANTS.

2. Evaluate the integral $\int \frac{dt}{16 + t^2}$. Show your work. (If you memorized a formula, show a check of your answer by differentiation.)

10 pts

(OVER)

3. Evaluate the integral $\int_{\pi/2}^{3\pi/4} \sin^5 x \cos^3 x \, dx$. Show your work.

20 pts

4. Evaluate the integral $\int r^4 \ln r \, dr$. Show your work.

20 pts

5. Consider the integral $\int_0^{\pi/2} \frac{dx}{x \sin x}$.

(a) Explain in one complete sentence why the integral is improper.

10 pts

(b) Use the Comparison Theorem to determine whether the integral is convergent or divergent. Show all your work, and be sure to state your conclusion: convergent or divergent.

10 pts

6. Evaluate the integral $\int \frac{x^2}{\sqrt{1-x^2}} dx$. Show your work.

20 pts

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