Name: SOLUTIONS

Quiz #5 - February 24, 2009

Instructions: Determine if the integral is convergent or divergent. If it is convergent, evaluate the integral. You must show some work, writing "divergent" with no work will not earn credit, even if correct.

1.

$$\int_1^\infty \frac{x+1}{x^2+2x}\,dx. \qquad u = x^2+2x \quad du = 2x+2$$

$$= \int \frac{1/2}{u}\,du = \frac{1}{2}\ln|x^2+2x|\Big|_1^\infty$$

Diverges since $\lim_{x\to\infty} \ln|x^2+2x| = \infty$

2.

$$\int_{-2}^{14} \frac{dx}{\sqrt[4]{x+2}}.$$

$$= \frac{4}{3}(x+2)^{3/4}\Big|_{-2}^{14}$$

$$= \frac{4}{3}\left(16^{3/4} - 0\right)$$

$$= 32/3$$

Name: SOLUTIONS

Quiz #5 - February 26, 2009

Instructions: Determine if the integral is convergent or divergent. If it is convergent, evaluate the integral. You must show some work, writing "divergent" with no work will not earn credit, even if correct.

1.
$$\int_2^\infty \frac{1}{2x^3}dx. = \int_2^\infty \frac{1}{2}x^{-3}dx = -\frac{1}{4}\cdot\frac{1}{x^2}\Big|_2^\infty$$
$$= 0 - -1/16$$
$$= 1/16$$

2.
$$\int_0^3 (x-1)^{-1/3}.dx = \int_0^1 (x-1)^{-1/3}dx + \int_1^3 (x-1)^{-1/3}dx$$
$$= \frac{3}{2}(x-1)^{2/3}\Big|_0^1 + \frac{3}{2}(x-1)^{2/3}\Big|_1^3$$
$$= \frac{3}{2}(0-1) + \frac{3}{2}(2^{2/3}-0)$$
$$= \frac{3}{2}(2^{2/3}-1)$$

vertical asymptote at $x=1$

must divide into two integrals!