

4. Do WebAssign 7.6. Remember that the WebAssign will be reopened three days before Exam II for you to review the problems. You will be allowed to improve your score by a maximum of three points. Additional attempts on the problems will not be given.

(3-6) Determine whether the following integrals converge. (You may calculate the limits by appealing to the dominance of one function over another, or by l'Hopital's rule.) If the integral converges, give its exact value.

5. $\int_1^{\infty} \frac{x}{4+x^2} dx$

6. $\int_0^4 \frac{1}{\sqrt{x}} dx$

7. $\int_2^{\infty} \frac{1}{x \ln(x)} dx$

8. $\int_{\pi/4}^{\pi/2} \frac{\sin(s)}{\sqrt{\cos(s)}} ds$

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9. Given that $\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi}$, calculate the exact value of

$$\int_{-\infty}^{\infty} e^{-(x-a)^2/b}$$

Comparing Integrals

Section 7.7
September 20, 2016

Name:
Math 129 - 01

Understand	Use the terminology “improper integral” for $\int_a^b g(x) dx$ where $g(x)$ is unbounded on $[a, b]$.
Apply	If $g(x)$ is unbounded at b calculate the integral $\int_a^b g(x) dx$, by calculating $\lim_{c \rightarrow b^-} \int_a^c g(x) dx$
Understand	Use the terminology “converges” if the result of this limit is finite, and “diverges” if it is infinite.
Apply	If $g(x)$ is unbounded at c , with $a < c < b$, calculate the integral $\int_a^b g(x) dx$, by splitting it into two integrals $\int_a^c g(x) dx + \int_c^b g(x) dx$.
Apply	Know that $\int_1^\infty \frac{1}{x^p} dx$ converges if _____ and diverges if _____.
Apply	$\int_0^\infty e^{-ax} dx$ converges if _____ and diverges if _____.
Synthesize	Use algebra, substitutions, and l’Hopital’s Rule to match any rational integrand to $\frac{1}{x^p}$ for some p .

1. Determine whether the following integrals converge or diverge. You should calculate the first one using methods from section 7.6. For each of the following integrals, you may either make a calculation or a comparison argument as in section 7.7. Include briefly the main idea of your calculation or argument, without going into too much detail.

(a) $\int_1^\infty \frac{1}{x^2} dx$

(b) $\int_1^\infty \frac{5}{x^2} dx$

(c) $\int_1^\infty \frac{5}{x^2 + 64} dx$

(d) $\int_1^\infty \frac{5x}{x^2 + 64} dx$

(e) $\int_1^\infty \frac{5x}{x^3 + 64x} dx$

(f) Why the fourth integral is the odd one out?

(g) Write one sentence explaining how the integrand of the the fourth integral is different from the others.

Quiz (Leave this space blank)