MAT 137 (Calculus II) Prof. Swift

In-class worksheet: Comparison Theorem for Improper Integrals

1. Evaluate the improper integral. Hint: Start by writing " = lim".

$$\int_0^1 \frac{1}{\sqrt{1-x^2}}\,dx$$

Try to determine if the improper integral converges or diverges, using the comparison theorem. In each case, compare to $\displaystyle\int_1^\infty \frac{1}{x^p}\,dx$ for some value of p.

2. $\displaystyle\int_1^\infty \frac{1}{\sqrt{x^3+1}}\,dx$

3. $\displaystyle\int_1^\infty \frac{\sin^2(x)}{x}\,dx$

4. $\displaystyle\int_1^\infty \frac{1+\cos^2(x)}{\sqrt{x}}\,dx$