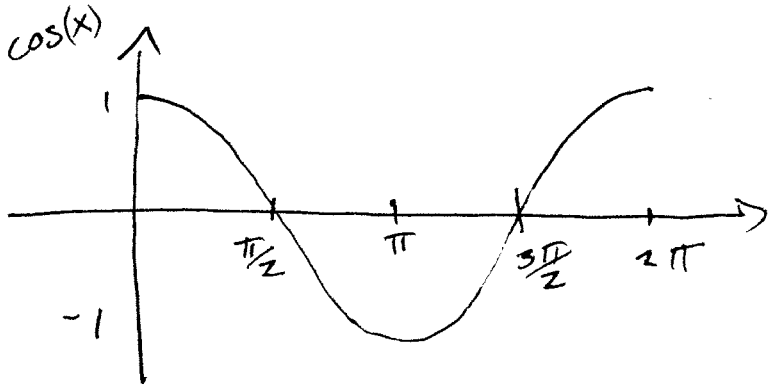
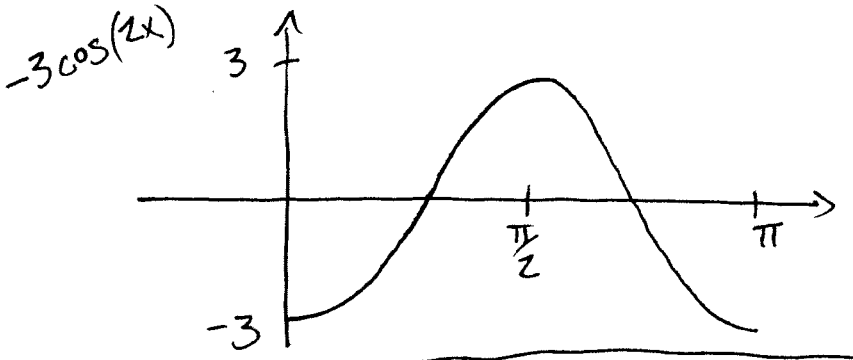
Math 122
Spring 2011
Instructor: Shawn Rafalski

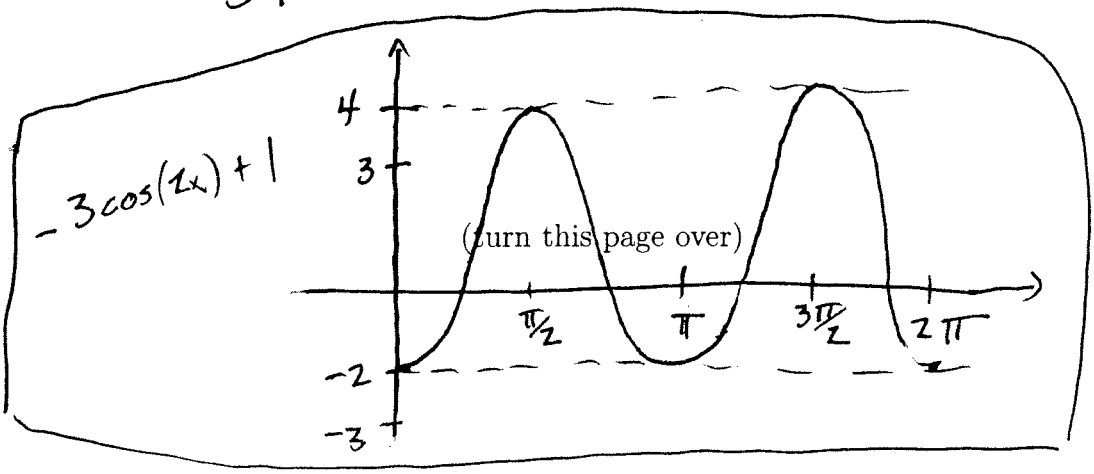
Applied Calculus II
Quiz 8
Write your name on this quiz

1. (5 points) Determine the amplitude and period of the function $f(x) = -3\cos(2x) + 1$. Graph this function over a two-period interval.

Amplitude = 3
Period = π







(turn this page over)

2. (5 points) Determine whether or not the improper integral $\int_1^\infty \frac{1}{x^4}\,dx$ converges. If it converges, compute the value of this integral.

$$\int_1^\infty \frac{1}{x^4}\,dx = \lim_{b\to\infty}\left(\int_1^b \frac{1}{x^4}\,dx\right)$$

$$= \lim_{b\to\infty}\left(\left(-\frac{1}{3x^3}\right)\Big|_1^b\right)$$

$$= \lim_{b\to\infty}\left(-\frac{1}{3b^3} + \frac{1}{3}\right) = 0 + \frac{1}{3} = \boxed{\frac{1}{3}}$$

The improper integral converges to $\frac{1}{3}$.