1. Evaluate the integral $\int_0^{\pi/2} \frac{\cos 2x}{\sqrt{9+\sin 2x}}, dx.$
2. Evaluate the integral $\int \sec^6 5x dx.$
3. Evaluate the integral $\int_0^1 \ln(1+4x^2), dx.$
4. Evaluate the integral $\int \frac{x^3}{x^2+1}, dx.$
5. Evaluate the integral $\int \frac{x^3}{\sqrt{x^2+1}}\, dx.$
6. Determine whether or not the improper integral converges. If it converges, find its value.
$$\int_0^\infty e^{-x} \cos x dx$$

ANSWERS:

1. 0
2. $\frac{\tan 5x}{5} + \frac{2\tan^3 5x}{15} + \frac{\tan^5 5x}{25} + C$
3. $\ln 5 - 2 + \arctan 2$
4. $\frac{x^2}{2} - \frac{1}{2}\ln|x^2+1| + C$
5. $\frac{(x^2+1)^{3/2}}{3} - \sqrt{x^2+1} + C$
6. The integral converges to 1/2.