MATH 151 Exam 2 Review Spring

Evaluate the following integrals:

1. $\int_0^3 \frac{1}{\sqrt{x}}\ dx$
2. $\int_{2\pi}^{\infty} sin\ \theta\ d\theta$
3. $\int_1^{\infty} \frac{ln\ x}{x}\ dx$
4. Use the Comparison Theorem to determine convergence or divergence.
   (a) $\int_0^1 \frac{e^{-x}}{\sqrt{x}}\ dx$
   (b) $\int_0^{\infty} \frac{x}{x^3+1}\ dx$
   (c) $\int_0^{\pi/2} \frac{dx}{x\ sin\ x}$
5. Show whether the integral is convergent or divergent. Evaluate it if it is convergent.
   (a) $\int_{-\infty}^{\infty} xe^{-x^2}\ dx$
6. Find $\lim_{x\to\infty}\ x\ sin(\pi/x)$
7. Determine whether the sequence is convergent or divergent. If it is convergent, find its limit.

$$a_n = \frac{ln\ n}{\sqrt{n}}$$

8. Determine whether the sequence converges or diverges. If it converges, find its limit.

$$a_n\ =\ \frac{2^n}{3^{n+1}}$$