

Name: _____

1. $\int \frac{2x-1}{x^3+x} dx$

2. $\int_0^1 \frac{1}{x^2} dx$

3. $\int_1^\infty \frac{\sin(1/x)}{x^2} dx$

4. For the following Series state whether the series converges or diverges, the test you used, the criteria satisfied and show your work.

(a) $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}} - \frac{1}{\sqrt{n+2}}$

(b) $\sum_{k=-1}^{\infty} \frac{3}{2^k}$

(c) $\sum_{k=1}^{\infty} \frac{k\sqrt{k+1}}{k^2 + 2k^3 + 11}$

(d) $\sum_{k=1}^{\infty} \frac{1}{\sqrt{k}}$

$$(e) \sum_{k=1}^{\infty} \frac{k}{2^k}$$

$$(f) \sum_{k=1}^{\infty} \frac{(k!)^2}{(2k)!}$$

$$(g) \sum_{k=1}^{\infty} \left(1 - \frac{2}{k}\right)^k$$

$$(h) \sum_{k=1}^{\infty} \left(1 - \frac{2}{k}\right)^{k^2}$$

$$(i) \sum_{k=1}^{\infty} (-1)^k \frac{k!}{k^k}$$

$$5. \int x^2 e^{x^3+1} dx$$

6. $\int x^2 e^{3x} dx$