

Homework Key for Section 1

1. Determine convergence or divergence. Evaluate those that converge.

$$(a) \int_1^{\infty} \frac{1}{(3x+1)^2} dx$$
$$\frac{1}{12}$$

$$(b) \int_{-\infty}^{-1} \frac{1}{\sqrt{2-x}} dx$$
$$D$$

$$(c) \int_4^{\infty} e^{-x/2} dx$$
$$2e^{-2}$$

$$(d) \int_{-\infty}^{\infty} \frac{x}{1+x^2} dx$$
$$D$$

$$(e) \int_{-\infty}^{\infty} xe^{-x^2} dx$$
$$0$$

$$(f) \int_{-2}^3 \frac{1}{x^4} dx$$
$$D$$

2. Use the Comparison Theorem to determine whether the integral is convergent or divergent.

$$(a) \int_0^{\infty} \frac{x}{x^3+1} dx$$
$$C$$

$$(b) \int_0^{\infty} \frac{\arctan x}{2+e^x} dx$$
$$C$$

Homework Key for Section 2

1. Find the following limits:

(a) $\frac{9}{5}$

(b) $-\infty$

(c) ∞

(d) $-\infty$

(e) ∞

(f) 1

(g) π

(h) $-2/\pi$

(i) ∞

Homework Key for Section 3

1. Determine if the following sequences converge or diverge. If they converge, find the limit.

(a)

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

(b)

$$a_n = \frac{3^{n+2}}{5^n}$$

(c)

$$a_n = \frac{(-1)^{n-1}}{n^2 + 1}$$

(d)

$$a_n = \cos(n/2)$$

(e)

$$a_n = \cos(2/n)$$

(f)

$$\{\arctan 2n\}$$

(g)

$$\{n^2 e^{-n}\}$$

(h)

$$a_n = n \sin(1/n)$$