

Worksheet #36: Improper Integrals II

Useful Formulas:

If f is continuous over the infinite interval $(-\infty, +\infty)$, then improper integral of f is defined as

$$\int_{-\infty}^{+\infty} f(x)dx = \int_{-\infty}^c f(x)dx + \int_c^{+\infty} f(x)dx$$

If f is continuous on the interval $[a, b]$, except for an infinite discontinuity at c in (a, b) , then the improper integral of f over the interval $[a, b]$ is defined as

$$\int_a^b f(x)dx = \int_a^c f(x)dx + \int_c^b f(x)dx$$

where c is any real number.

* The improper integral is said to **converge** if **both terms converge** and **diverge** if **either term diverges**.

Evaluate the following integrals.

1.
$$\int_{-\infty}^{+\infty} \frac{4x}{(x^2 + 5)^2} dx$$

2.
$$\int_0^{10} \frac{5}{(x-9)} dx$$