

MCS-121**Properties of Definite Integrals**

1. Given $\int_1^4 f(x) dx = 7$, $\int_2^4 f(x) dx = 5$, $\int_4^6 f(x) dx = -2$ and $\int_1^4 g(x) dx = 2$, calculate the following integrals.

(a) $\int_1^4 4f(x) dx$

(b) $\int_1^4 g(x) - f(x) dx$

(c) $\int_1^4 [8f(x) - 7g(x)] dx$

(d) $\int_1^2 -f(x) dx$

(e) $\int_4^2 f(x) dx$

(f) $\int_1^6 f(x) dx$

2. Write the given sum or difference as a single integral in the form $\int_a^b f(x) dx$

(a) $\int_1^3 f(x) dx + \int_3^6 f(x) dx + \int_6^{12} f(x) dx$

(b) $\int_2^{10} f(x) dx - \int_2^7 f(x) dx$

3. Show that $\int_1^4 \sqrt{1+x^2} dx \geq 3\sqrt{2}$.