

Use the given values and rules for integrals to solve each integral.

1. $\int_1^3 f(x) dx = 4$; $\int_1^7 f(x) dx = -3$; $\int_1^3 g(x) dx = -1$; $\int_1^7 g(x) dx = 7$; Find the following integrals:

$$a. \int_7^1 f(x) dx = - \int_1^7 f(x) dx = -(-3) = \boxed{3}$$

$$b. \int_1^3 f(x) + g(x) dx = \int_1^3 f(x) dx + \int_1^3 g(x) dx = 4 + (-1) = \boxed{3}$$

$$c. \int_1^1 f(x) dx = \boxed{0}$$

$$d. \int_3^7 g(x) dx = \int_1^7 g(x) dx - \int_1^3 g(x) dx = 7 - (-1) = \boxed{8}$$

$$e. \int_7^3 (f(x) - g(x)) dx = - \int_3^7 (f(x) - g(x)) dx = - \left[\int_3^7 f(x) dx - \int_3^7 g(x) dx \right] = - \left[-3 - 4 - 8 \right] = -(-15) = \boxed{15}$$

2. $\int_5^{-1} f(x) dx = 3$; $\int_2^5 f(x) dx = -4$; $\int_{-1}^1 f(x) dx = 1$; $\int_1^{-1} h(x) dx = -2$; $\int_{-1}^5 h(x) dx = 3$; Find the following integrals:

$$a. \int_{-1}^2 f(x) dx = \int_{-1}^5 f(x) dx - \int_2^5 f(x) dx = 3 - (-4) = \boxed{7}$$

$$b. \int_1^2 f(x) dx = \int_{-1}^2 f(x) dx - \int_{-1}^1 f(x) dx = 1 - 1 = \boxed{0}$$

$$c. \int_{-1}^1 (h(x) - f(x)) dx = \int_{-1}^1 h(x) dx - \int_{-1}^1 f(x) dx = -2 - 1 = \boxed{-3}$$

$$d. \int_1^5 h(x) dx = \int_{-1}^5 h(x) dx - \int_{-1}^1 h(x) dx = 3 - (-2) = \boxed{5}$$

$$e. \int_{-1}^5 (f(x) + h(x)) dx = \int_{-1}^5 f(x) dx + \int_{-1}^5 h(x) dx = 3 + 3 = \boxed{6}$$