Calculus 1 – Set 5.9 #1-10

Given: $\int_0^1 f(x)\,dx = 2$ $\quad$ $\int_1^2 f(x)\,dx = 3$

$\int_0^1 g(x)\,dx = -1$ $\quad$ $\int_0^2 g(x)\,dx = 4$

1. $\int_0^2 f(x)\,dx =$

$$\int_0^2 f(x)\,dx = \int_0^1 f(x)\,dx + \int_1^2 f(x)\,dx$$

$$\int_0^2 f(x)\,dx = 2 + 3$$

$$\int_0^2 f(x)\,dx = 5$$

2. $\int_0^2 \left[f(x) + 2g(x)\right] dx =$

$$\int_0^2 \left[f(x) + 2g(x)\right] dx = \int_0^2 f(x)\,dx + \int_0^2 2g(x)\,dx$$

$$\int_0^2 \left[f(x) + 2g(x)\right] dx = \int_0^2 f(x)\,dx + 2\int_0^2 g(x)\,dx$$

$$\int_0^2 \left[f(x) + 2g(x)\right] dx = 5 + 2(4)$$

$$\int_0^2 \left[f(x) + 2g(x)\right] dx = 5 + 8$$

$$\int_0^2 \left[f(x) + 2g(x)\right] dx = 13$$

3. $\int_1^2 g(x)\,dx =$

$$\int_0^2 g(x)\,dx = \int_0^1 g(x)\,dx + \int_1^2 g(x)\,dx$$

$$4 = -1 + \int_1^2 g(x)\,dx$$

$$5 = \int_1^2 g(x)\,dx$$

$$\int_1^2 g(x)\,dx = 5$$

4. $\int_2^0 g(x)\,dx =$

$$\int_2^0 g(x)\,dx = -\int_0^2 g(x)\,dx$$

$$\int_2^0 g(x)\,dx = -(4)$$

$$\int_2^0 g(x)\,dx = -4$$

5. $\int_2^1 3f(x)\,dx =$

$\int_2^1 3f(x)\,dx = 3\int_2^1 f(x)\,dx =$

$\int_2^1 3f(x)\,dx = -3\int_1^2 f(x)\,dx =$

$\int_2^1 3f(x)\,dx = -3(3)$

$\int_2^1 3f(x)\,dx = -9$

6. $\int_1^1 g(x)\,dx =$

$\int_1^1 g(x)\,dx = 0$

7. $\int_0^2 \left[2f(x) - 3g(x)\right]dx =$

$\int_0^2 \left[2f(x) - 3g(x)\right]dx = \int_0^2 2f(x)\,dx - \int_0^2 3g(x)\,dx$

$\int_0^2 \left[2f(x) - 3g(x)\right]dx = 2\int_0^2 f(x)\,dx - 3\int_0^2 g(x)\,dx$

$\int_0^2 \left[2f(x) - 3g(x)\right]dx = 2(5) - 3(4)$

$\int_0^2 \left[2f(x) - 3g(x)\right]dx = 10 - 12$

$\int_0^2 \left[2f(x) - 3g(x)\right]dx = -2$

8. $\int_0^1 \left[2f(x) + 3g(x) - 4\right]dx =$

$\int_0^1 \left[2f(x) + 3g(x) - 4\right]dx = \int_0^1 2f(x)\,dx + \int_0^1 3g(x)\,dx - \int_0^1 4\,dx$

$\int_0^1 \left[2f(x) + 3g(x) - 4\right]dx = 2\int_0^1 f(x)\,dx + 3\int_0^1 g(x)\,dx - \int_0^1 4\,dx$

$\int_0^1 \left[2f(x) + 3g(x) - 4\right]dx = 2(2) + 3(-1) - \left[4x\right]_0^1$

$\int_0^1 \left[2f(x) + 3g(x) - 4\right]dx = 4 - 3 - \left[4 - 0\right]$

$\int_0^1 \left[2f(x) + 3g(x) - 4\right]dx = 1 - \left[4\right]$

$\int_0^1 \left[2f(x) + 3g(x) - 4\right]dx = -3$

9. $\int_1^2 f(x)\,dx + \int_2^0 f(x)\,dx =$

$$\int_1^2 f(x)\,dx + \int_2^0 f(x)\,dx = \int_1^2 f(x)\,dx - \int_0^2 f(x)\,dx =$$

$$\int_1^2 f(x)\,dx + \int_2^0 f(x)\,dx = 3 - 5$$

$$\int_1^2 f(x)\,dx + \int_2^0 f(x)\,dx = -2$$

10. $\int_1^2 g(x)\,dx + \int_2^0 g(x)\,dx =$

$$\int_1^2 g(x)\,dx + \int_2^0 g(x)\,dx = \int_1^2 g(x)\,dx - \int_0^2 g(x)\,dx =$$

$$\int_1^2 g(x)\,dx + \int_2^0 g(x)\,dx = 5 - 4$$

$$\int_1^2 g(x)\,dx + \int_2^0 g(x)\,dx = 1$$