201-203-RE - Practice Set #5: Properties of the Definite Integral

1. Find the value(s) of k such that $\int_{1}^{2} \left[2k^2x - 3x^2\right]\ dx = 20$.

2. Find the value(s) of k such that $\int_{-1}^{0} \left[5k + 3k^2x^2\right]\ dx = 6$.

3. If $\int_{2}^{5} f(x)\ dx = 6$ and $\int_{3}^{5} f(x)\ dx = 4$, evaluate $\int_{2}^{3} f(x)\ dx$.

4. If $\int_{-1}^{4} f(x)\ dx = 4$ and $\int_{-1}^{4} g(x)\ dx = 6$, evaluate $\int_{-1}^{4} [3f(x) - 2g(x) + 3]\ dx$.

5. Find the area of the region bounded by $f(x) = 3x^2 - 6x$ and the x-axis, from $x = -1$ to $x = 1$.

6. Given $\int_{-3}^{0} 9k\sqrt{x+4} - 6k^3\ dx = 0$, find the value(s) of k.

7. Given $\int_{0}^{4} \frac{6k}{4+3x}\ dx = 4$, find the value(s) of k.

8. Given $\int_{1}^{2} k^2 - k(x-1)^3\ dx = 0$, find the value(s) of k.

9. If $\int_{1}^{5} f(x)\ dx = 20$ and $\int_{1}^{0} f(x)\ dx = 17$, evaluate $\int_{0}^{5} f(x)\ dx$.

10. If $\int_{3}^{5} 3f(x)\ dx = 5$ and $\int_{3}^{5} 2g(x)\ dx = 3$, evaluate $\int_{3}^{5} [6f(x) + 4g(x) + 7]\ dx$.

11. If $\int_{-4}^{1} 4f(x)\ dx = 2$ and $\int_{-4}^{1} 3g(x)\ dx = 9$, evaluate $\int_{-4}^{1} [2f(x) - 6g(x) + 12]\ dx$.

12. If $\int_{2}^{3} f(x)\ dx = 10$ and $\int_{2}^{-1} f(x)\ dx = 12$, evaluate $\int_{-1}^{3} [4f(x) + 9]\ dx$.

13. If $\int_{-3}^{0} f(x)\ dx = 8$ and $\int_{1}^{0} f(x)\ dx = 5$, evaluate $\int_{-3}^{1} [4f(x) + 7]\ dx$.

14. If $\int_{-1}^{2} 2f(x)\ dx = 10$ and $\int_{-1}^{2} g(x)\ dx = 7$, evaluate $\int_{-1}^{2} [f(x) - 2g(x) + 3]\ dx$.

15. If $\int_{1}^{3} 4f(x)\ dx = 8$ and $\int_{1}^{3} 2g(x)\ dx = 3$, evaluate $\int_{1}^{3} [3f(x) - 4g(x) + 5]\ dx$.

16. If $\int_{-1}^{0} f(x)\ dx = 11$ and $\int_{-3}^{-1} f(x)\ dx = 3$, evaluate $\int_{-3}^{0} [4f(x) - 1]\ dx$.

17. If $\int_{4}^{5} f(x)\ dx = 6$ and $\int_{0}^{5} f(x)\ dx = 1$, evaluate $\int_{0}^{4} [2f(x) + 3]\ dx$.

18. If $\int_{-3}^{2} f(x)\ dx = 3$ and $\int_{0}^{-3} f(x)\ dx = 7$, evaluate $\int_{0}^{2} [2f(x) + 5]\ dx$.

ANSWERS:

(1) $k = \pm 3$

(2) $k = -6, 1$

(3) 2

(4) 15

(5) 6

(6) $k = 0, \pm\sqrt{\frac{7}{3}}$

(7) $k = \frac{1}{\ln(2)}$

(8) $k = 0, \frac{1}{4}$

(9) 3

(10) 30

(11) 43

(12) 28

(13) 40

(14) 0

(15) 10

(16) 53

(17) 2

(18) 30