

Keeper 6.4 Virtual Problems – The Fundamental Theorem of Calculus Day 1

Find the value of the definite integral. Show your algebraic work.

1. $\int_{-1}^1 t^2 - t \, dt$

2. $\int_1^2 \frac{3}{x^2} - 1 \, dx$

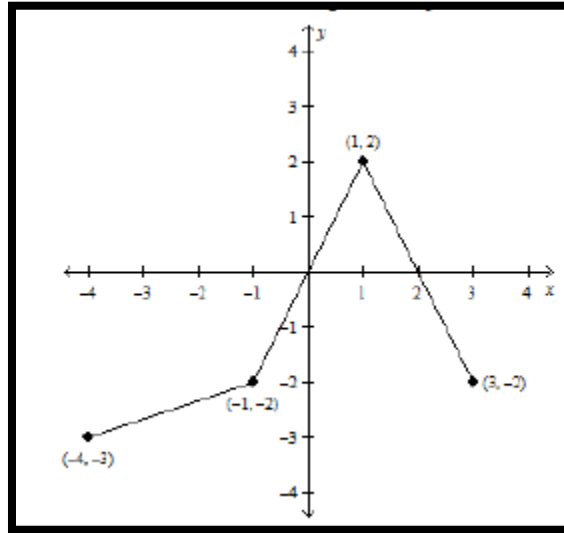
3. $\int_1^4 \frac{(u-2)}{\sqrt{u}} \, du$

4. $\int_{-2}^{-1} \left(x - \frac{1}{x^2} \right) \, dx$

5. $\int_0^\pi (1 + \sin x) \, dx$

6. $\int_1^3 (3x^2 + 5x - 4) \, dx$

Pictured below is the graph of a function f . Find the values of each of the following definite integrals. If a value does not exist, explain why.



7. $\int_{-4}^2 f(x) dx$

8. $\int_0^3 f(x) dx$

9. $\int_{-1}^1 f(x) dx$

10. $\int_{-4}^0 f'(x) dx$

11. $\int_{-1}^1 f'(x) dx$

12. $\int_1^3 f'(x) dx$

Keeper 6.4 Virtual Problems – The Fundamental Theorem of Calculus Day 2

Given $\int_2^6 f(x)dx = 10$ and $\int_2^6 g(x)dx = -2$, find the values of each of the following definite integrals, if possible, by rewriting the given integral using integral properties.

1. $\int_2^6 [f(x) + g(x)]dx$

2. $\int_2^6 [2f(x) - 3g(x)]dx$

3. $\int_6^2 6g(x)dx$

4. $\int_2^6 \left[\frac{g(x)}{2f(x)} \right] dx$

Given $\int_2^4 f(x)dx = -6$ and $\int_2^4 g(x)dx = 4$, find the values of each of the following definite integrals. Rewrite the given integral using integral properties, then find the value.

5. $\int_{-2}^4 [f(x) + 4]dx$

6. $\int_2^4 [3g(x) + x]$

7. $\int_{-2}^4 \left[\frac{1}{2}f(x) + 3x^2 \right] dx$

Use Part 1 of the Fundamental Theorem of Calculus to find the derivative of the following functions:

8. $g(x) = \int_1^x (2 + t^4)^5 dt$

9. $y(x) = \int_{\frac{1}{x^2}}^0 \sin^3 t dt$

10. $F(x) = \int_x^4 \cos(t^5) dt$

11. $G(x) = \int_{\sqrt{x}}^{x^2} \sqrt{t} \cdot \sin(t) dt$

12. $h(x) = \int_0^{x^2} \sqrt[3]{1+r^3} dr$

13. $f(x) = \int_1^x \frac{1}{t^3+1} dt$

14. $p(x) = \int_1^{e^x} \ln t dt$

15. $s(x) = \int_x^1 \cos \sqrt{t} dt$

16. $m(x) = \int_{1-2x}^{1+2x} t \cdot \sin t dt$