



Calculus 2 Workbook

Antiderivatives and indefinite integrals

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MATH

INDEFINITE INTEGRALS

- 1. Evaluate the indefinite integral.

$$\int 5x^4 - 4x^3 + 6x^2 - 2x + 1 \, dx$$

- 2. Evaluate the indefinite integral.

$$\int \frac{3x^3 + x^2 - 12x - 4}{x^2 - 4} \, dx$$

- 3. Evaluate the indefinite integral.

$$\int (5x - 7)(3x + 2) \, dx$$

- 4. Evaluate the indefinite integral.

$$\int \frac{x^3 - 3x + 2}{x^3} \, dx$$



PROPERTIES OF INTEGRALS

- 1. Given the value of each of these integrals,

$$\int_0^3 f(x) \, dx = 7 \quad \int_3^6 f(x) \, dx = 9 \quad \int_0^3 g(x) \, dx = 2 \quad \int_3^6 g(x) \, dx = 5$$

what is the value of of the following integral?

$$\int_0^6 [2f(x) + 3g(x)] \, dx$$



FIND F GIVEN F''

- 1. Find $f(x)$ from its second derivative.

$$f''(x) = 3x^2 + 4x - 7$$

- 2. Find $g(x)$ from its second derivative.

$$g''(x) = \frac{x^4 - 4x^2 + 4}{x^2 - 2}$$

- 3. Find $h(x)$ from its second derivative.

$$h''(x) = \frac{8x^3 - 9x^2 + 6x}{x^7}$$



FIND F GIVEN F'''

- 1. Find $f(x)$ given its third derivative.

$$f'''(x) = 2x + 3$$

- 2. Find $g(x)$ given its third derivative.

$$g'''(x) = 4x^3 + x^2 - 3$$

- 3. Find $h(x)$ given its third derivative.

$$h'''(x) = \frac{3}{x^5} - \frac{2}{x^4} + 4$$



INITIAL VALUE PROBLEMS

- 1. Find $f(x)$ if $f'(x) = 7x - 5$ and $f(4) = 24$.

- 2. Find $g(x)$ if $g'(x) = 2x^2 + 5x - 9$ and $g(-4) = 34$.

- 3. Find $h(x)$ if $h'(x) = 3x^2 + 8x + 1$ and $h(2) = 31$.

- 4. Find $f(x)$ if $f'(x) = x^3 + 4x + 3$ and $f(-2) = 15$.



FIND F GIVEN F'' AND INITIAL CONDITIONS

- 1. Find $g(x)$ if $g''(x) = 2x + 1$, $g'(1) = 5$, and $g(1) = 4$.

- 2. Find $h(x)$ if $h''(x) = 2x - 7$, $h'(3) = -20$, and $h(6) = -98$.

- 3. Find $f(x)$ if $f''(x) = 3x - 6$, $f'(2) = 2$, and $f(2) = 15$.



