

University of Bahrain
Department of Mathematics
MATHS101: Calculus I
Dr. Abdulla Eid



Worksheet: Fundamental Theorem of Calculus

Students' Name: _____

1. Find the derivative of the following functions:

$$1. g(x) = \int_x^2 \sqrt{1 + \sec t} dt$$

$$2. g(x) = \int_{\sin x}^{x^9} \tan^9 t dt$$

$$3. g(x) = \int_1^4 \left(x^3 + \frac{1}{x} \right) dx$$

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2. Find the following definite integrals:

1. $\int_1^4 \left(x^3 + \frac{1}{x} \right) dx$

2. $\int_{-1}^1 (x+1)^2 dx$

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3. $\int_0^1 \frac{2}{1+x^2} dx.$

3. If $\int_a^3 (3x^2 + 2x) dx = 36$, then find the value of a .

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4. If $\int_1^5 f(x) dx = 3$, $\int_1^3 f(x) dx = 1$, and $\int_1^3 h(x) dx = 5$ then find

1. $\int_1^5 -2f(x) dx$.

2. $\int_1^3 [f(x) + h(x)] dx$.

3. $\int_1^3 [2f(x) - 5h(x)] dx$.

4. $\int_5^1 f(x) dx$.

5. $\int_3^5 f(x) dx$.

6. $\int_3^1 [h(x) - f(x)] dx$.

7. $\int_3^3 [h(x) - f(x)] dx$.

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5. Given

$$f(x) = \begin{cases} 3x^2, & x < 1 \\ 2x + 1, & 1 \leq x \end{cases}$$

Evaluate $\int_{-1}^2 f(x) dx$

6. Evaluate $\int_{-5}^7 |x| dx$

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