

Fundamental Theorem of Calculus – Part I (NC)

Name: \_\_\_\_\_

Write out the FTC I (in words), then use it to solve the problems that follow.

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For each problem, find  $F'(x)$ . Be accurate with notation, especially with  $u$ -substitution.

1.  $F(x) = \int_{-4}^x (t - 1) dt$

2.  $F(x) = \int_{-3}^x (t^2 + 2t + 3) dt$

3.  $F(x) = \int_{-1}^{x^2} (-2t + 2) dt$

4.  $F(x) = \int_4^{3x} (-t^3 + 11t^2 - 39t + 44) dt$

5.  $F(x) = \int_2^{x^3} \left(\frac{1}{t^3}\right) dt$

6.  $F(x) = \int_1^{x^3} t \sin(2t) dt$

**Answers:**  $F'(x) = \frac{3}{x^7}$

$F'(x) = -4x^3 + 4x$

$F'(x) = 3x^5 \sin(2x^3)$

$F'(x) = -81x^3 + 297x^2 - 351x + 132$

$F'(x) = x^2 + 2x + 3$

$F'(x) = x - 1$