

MATH1520AB 2021-22 Tutorial 8 (week 12)

Bowen Dai

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1. Evaluate each of the following definite integrals.

$$(a) \int_{-5}^{-2} \left(7e^x + \frac{2}{x}\right) dx$$

$$(b) \int_3^6 |2x - 10| dx$$

Answer.

$$(a) \int_{-5}^{-2} \left(7e^x + \frac{2}{x}\right) dx = (7e^y + 2 \ln |y|) \Big|_{-5}^{-2} = (7e^{-2} + 2 \ln |-2|) - (7e^{-5} + 2 \ln |-5|) = 7(e^{-2} - e^{-5}) + 2(\ln(2) - \ln(5))$$

$$(b) \int_3^6 |2x - 10| dx = \int_3^5 |2x - 10| dx + \int_5^6 |2x - 10| dx = \int_3^5 -2x + 10 dx + \int_5^6 2x - 10 dx = (-x^2 + 10x) \Big|_3^5 + (x^2 - 10x) \Big|_5^6 = [25 - 21] + [-24 - (-25)] = 5$$

2. Find the derivative $f'(x)$ of each of the following functions.

$$(a) f(x) = \int_1^{x^2} t dt$$

Answer.

$$(a) f'(x) = (x^2) \times (2x) = 2x^3$$