

Name Solutions

You have 15 minutes for this quiz - no calculators allowed.

1. (3 points each) Evaluate the following definite and indefinite integrals.

$$(a) \int_0^1 \frac{12}{4x+3} dx = \int_3^7 \frac{3}{u} du = (3 \ln |u|) \Big|_3^7$$

$$u = 4x + 3$$

$$du = 4 dx$$

$$= 3 \ln 7 - 3 \ln 3$$

$$(b) \int \sin(2x) \cos^4(2x) dx = \int -\frac{1}{2} u^4 du$$

$$u = \cos(2x)$$

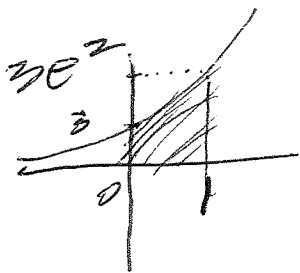
$$du = -\sin(2x) \cdot 2 dx$$

$$= -\frac{1}{2} \cdot \frac{1}{5} u^5 + C$$

$$= -\frac{1}{10} \cos^5(2x) + C$$

2. (2 points each) Set up, but do not evaluate, definite integrals which represent the given quantities. Use proper notation.

(a) The area of the region bounded by the  $x$ -axis and the graph of  $y = 3e^{2x}$  on the interval  $[0, 1]$ .

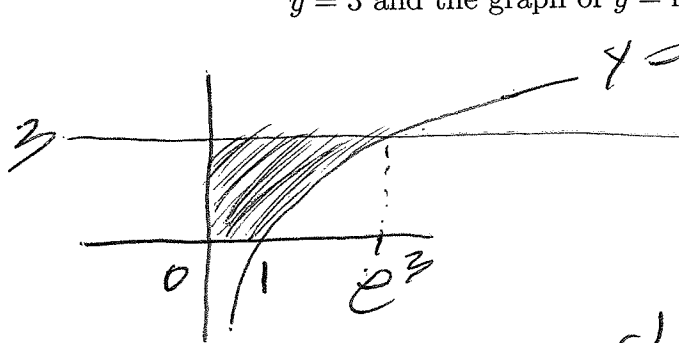


$$A = \int_0^1 3e^{2x} dx$$

or

$$A = \int_0^3 1 dy + \int_3^{3e^2} \left(1 - \frac{1}{2} \ln\left(\frac{y}{3}\right)\right) dy$$

(b) The area of the first quadrant region bounded by the  $x$ -axis, the  $y$ -axis, the line  $y = 3$  and the graph of  $y = \ln x$ .



$$A = \int_0^1 3 dx + \int_1^{e^3} (3 - \ln x) dx$$

or

$$A = \int_0^3 e^y dy$$