



AP Calculus AB 2000 Student Samples

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A₁

Work for problem 6(a)

$$\frac{dy}{dx} = \frac{3x^2}{e^{2y}}$$

$$e^{2y} dy = 3x^2 dx$$

$$\int e^{2y} dy = \int 3x^2 dx$$

$$\frac{1}{2} e^{2y} = x^3 + C$$

$$\frac{1}{2} \cdot e^0 = 0 + C$$

$$C = \frac{e}{2}$$

$$f(0) = \frac{1}{2}$$

$x=0$
 $y=\frac{1}{2}$

$$\frac{1}{2} e^{2y} = x^3 + \frac{e}{2}$$

$$e^{2y} = 2x^3 + e$$

$$2y = \ln(2x^3 + e)$$

$$y = \frac{\ln(2x^3 + e)}{2}$$

$$y = \frac{\ln(2x^3 + e)}{2}$$

$$\ln e^0 = e^0$$

Continue problem 6 on page 15.

Work for problem 6(b)

Domain...
 $\ln(2x^3 + e)$

$$2x^3 + e > 0$$

$$2x^3 > -e$$

$$x^3 > -\frac{e}{2}$$

$$x > -\sqrt[3]{\frac{e}{2}}$$



Range...

$$y = \frac{\ln(2x^3 + e)}{2}$$

$$\begin{aligned} \text{Domain } D: & \{x \mid x > -\sqrt[3]{\frac{e}{2}}\} \\ \text{Range } R: & \{y \mid y \in \mathbb{R}\} \end{aligned}$$

END OF EXAMINATION

THE FOLLOWING INSTRUCTIONS APPLY TO THE BACK COVER OF THIS SECTION II BOOKLET.

- MAKE SURE YOU HAVE COMPLETED THE IDENTIFICATION INFORMATION AS REQUESTED ON THE BACK OF THIS SECTION II BOOKLET.
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Work for problem 6(a)

$$\begin{aligned}
 f(x) &= \int \frac{3x^2}{e^{2y}} \frac{dy}{dx} \\
 &= \int e^{2y} dy = \int 3x^2 dx \\
 &= 2e^{2y} = x^3 + C
 \end{aligned}$$

but @ $x=0, y = \frac{1}{2}$

$$\begin{aligned}
 \text{AAD } 2e^{2(\frac{1}{2})} &= 0^3 + C \\
 2e &= C
 \end{aligned}$$

$$2e^{2y} = x^3 + 2e$$

$$e^{2y} = \frac{x^3 + 2e}{2}$$

$$2y = \ln\left(\frac{x^3 + 2e}{2}\right)$$

$$y = \frac{1}{2} \ln\left(\frac{x^3 + 2e}{2}\right)$$

Work for problem 6(b)

Ca

$$\frac{x^3 + 2e}{2} > 0$$

$$x^3 + 2e > 0$$

$$x^3 > -2e$$

$$x > \sqrt[3]{-2e}$$

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Work for problem 6(a)

F1

$$e^{2y} dy = 3x^2 dx$$

$$\int e^{2y} dy = \int 3x^2 dx$$

$$\frac{e^{2y}}{2} = x^3$$

$$e^{2y} = 2x^3$$

$$2y = \ln 2x^3$$

$$y = \frac{\ln 2x^3}{2}$$

$$f(x) = \frac{\ln 2x^3}{2}$$

$$f(0) = \frac{\ln 0}{2} = \frac{1}{2}$$

Continue problem 6 on page 15.

Work for problem 6(b)

$\overline{F_2}$

$$\ln x > 0$$

$$2x^3 > 0$$

$$D: x > 0$$

$$R: \text{all } \mathbb{R}_0$$

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