



## **AP<sup>®</sup> Calculus AB (Operational) 2004 Sample Student Responses**

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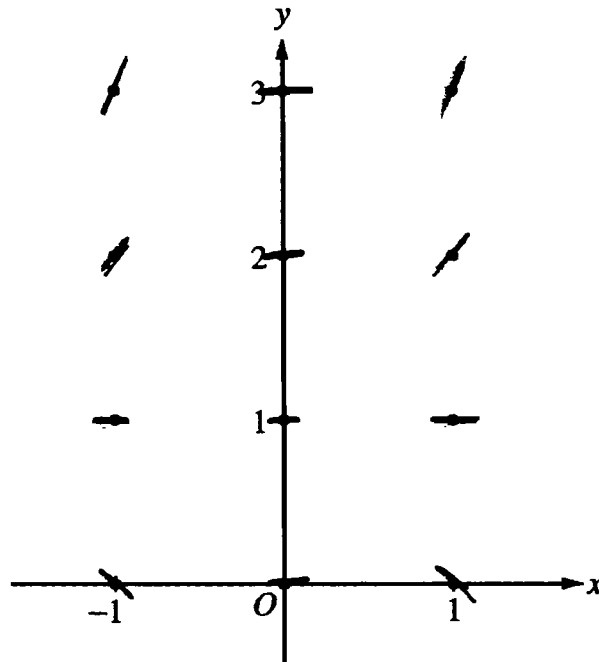
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A

NO CALCULATOR ALLOWED

Work for problem 6(a)



Work for problem 6(b)

$$y > 1;$$

$$x \neq 0;$$

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Continue problem 6 on page 15.

6



6



6



6



6



A2

NO CALCULATOR ALLOWED

Work for problem 6(c)

$$\int \frac{1}{y-1} dy = \int x^2 dx$$

$$\ln|y-1| = \frac{1 \cdot x^3}{3} + C$$

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

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

$$f(x) = k e^{\frac{x^3}{3}} + 1$$

$$f(0) = 3 = k(1) + 1$$

$$k = 2$$

$$f(x) = 2e^{\frac{x^3}{3}} + 1$$

END OF EXAMINATION

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## NO CALCULATOR ALLOWED

Work for problem 6(a)

$$\frac{dy}{dx} = x^2(y-1)$$

$$(-1, 0) = -1$$

$$(-1, 1) = 0$$

$$(-1, 2) = 1$$

$$(-1, 3) = 2$$

$$(0, 0) = 0$$

$$(0, 1) = 0$$

$$(0, 2) = 0$$

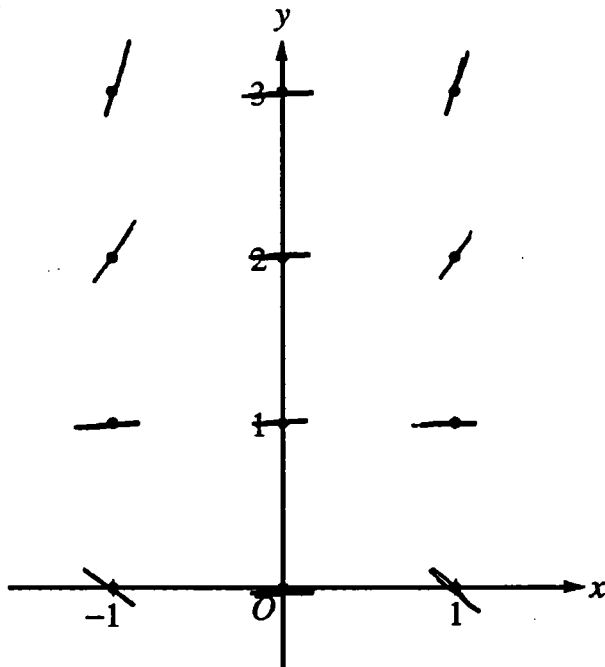
$$(0, 3) = 0$$

$$(1, 0) = -1$$

$$(1, 1) = 0$$

$$(1, 2) = 1$$

$$(1, 3) = 2$$



Work for problem 6(b)

b) if the  $y$  value of the point is  $1 < y$   
then the slope will be positive.

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Continue problem 6 on page 15.



NO CALCULATOR ALLOWED

Work for problem 6(c)

$$\frac{dy}{dx} = x^2(y-1)$$

$$u = y-1$$

$$du = 1$$

$$x^2(y-1)dx = dy$$

$$\int x^2 dx = \int \frac{dy}{y-1}$$

$$\frac{x^3}{3} + c = \ln(y-1)$$

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

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

$$y(0) = 3$$

$$Ce^{\frac{1}{3}(0)^3} + 1 = 3$$

$$Ce^0 = 2$$

$$C = 2$$

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

END OF EXAMINATION

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