AP® Calculus AB (Operational)
2004 Sample Student Responses

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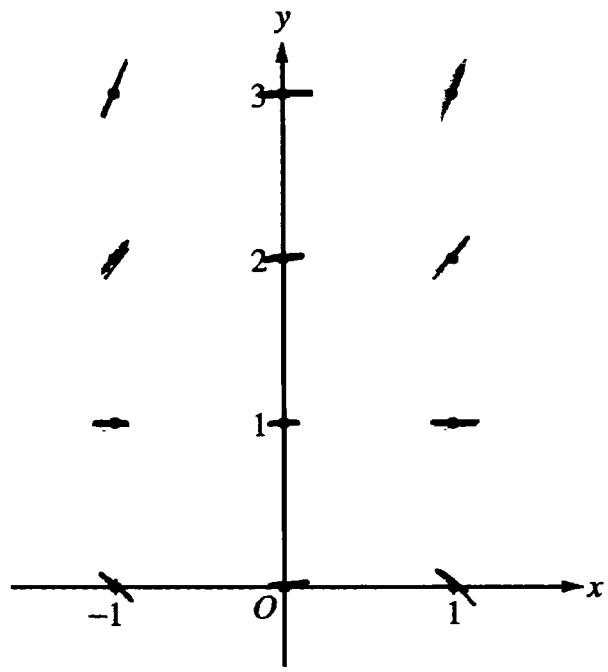
A1

NO CALCULATOR ALLOWED

Work for problem 6(a)



Work for problem 6(b)

$y > 1;$

$x \neq 0;$

Continue problem 6 on page 15.

NO CALCULATOR ALLOWED

Work for problem 6(c)

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

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

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

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

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

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

$$k = 2$$

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

Do not write beyond this border.

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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NO CALCULATOR ALLOWED

Work for problem 6(a)

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

$(-1,0) = -1$

$(-1,1) = 0$

$(-1,2) = 1$

$(-1,3) = 2$

$(0,0) = 0$

$(0,1) = 0$

$(0,2) = 0$

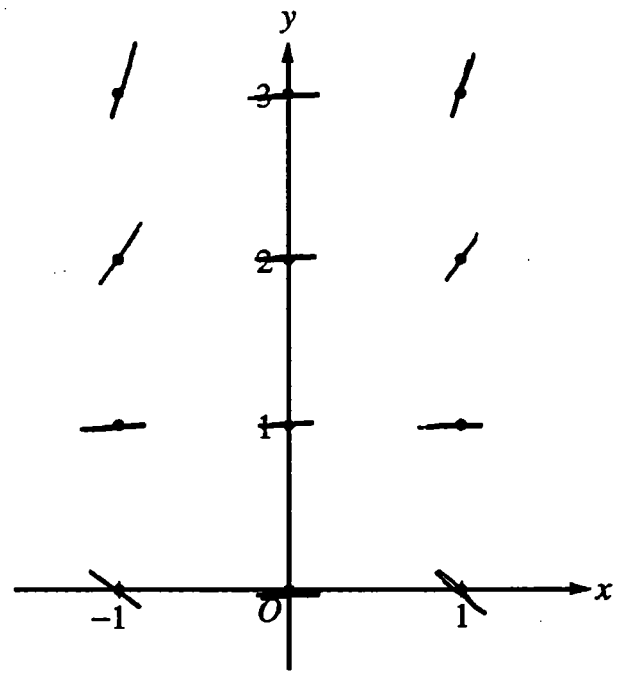
$(0,3) = 0$

$(1,0) = -1$

$(1,1) = 0$

$(1,2) = 1$

$(1,3) = 2$



Work for problem 6(b)

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

Continue problem 6 on page 15.

NO CALCULATOR ALLOWED

Work for problem 6(c)

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

$du = 1$

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

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

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

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

$Ce^{1/3x^3} + 1 = y$ $\quad f(0) = 3$

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

$Ce^0 = 2$

$C = 2$

$y = 2e^{(1/3x^3)} + 1$

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