

AP Calculus BC 2000 Student Samples

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CALCULUS BC SECTION II, Part B Time—45 minutes

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Number of problems-3

No calculator is allowed for these problems.

Work for problem 4(a)

$$\vec{\nabla} = \langle \frac{\partial \chi}{\partial t}, \frac{\partial \chi}{\partial t} \rangle = \langle 1 - \frac{1}{t^2}, 2 - \frac{1}{t^2} \rangle$$

$$\vec{a} = \langle \frac{\partial^2 \chi}{\partial t^2}, \frac{\partial^2 \chi}{\partial t^2} \rangle = \langle 2t^{-3}, -2t^{-3} \rangle$$

$$\Rightarrow \vec{a}(3) = \langle \frac{2}{27}, -\frac{2}{27} \rangle$$

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Work for problem 4(b)

$$x(t) = \int \left(\frac{dx}{dt}\right) dt = \int (1 - t^{-2}) dt = t + t^{-1} + c$$

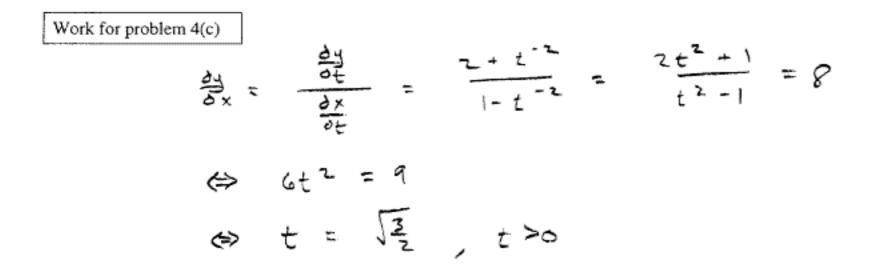
$$x(1) = 2 + c = 2 \Rightarrow c = 0$$

$$y(t) = \int \left(\frac{dy}{dt}\right) dt = \int (2 + t^{-2}) dt = 2t - t^{-1} + c$$

$$y(1) = 1 + c = 6 \Rightarrow c = 5$$

$$\Rightarrow (x(t), y(t)) = (t + t^{-1}, 2t - t^{-1} + 5)$$

$$\therefore (x(1), y(1)) = (\frac{10}{3}, \frac{3x}{3})$$
Continue problem 4 on page 11.



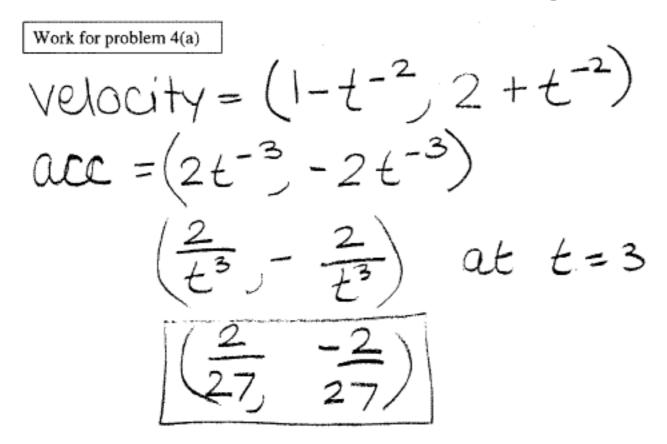
Work for problem 4(d)

$$\frac{dim}{d \cdot m} \left(\frac{\partial y}{\partial x}\right) = \int_{t \to \infty}^{t} \left(\frac{2t^{2} + 1}{t^{2} - 1}\right) \qquad both numeratures deconistingto be undefined, so byL'Hopital's Rule,= $\int_{t \to \infty}^{t} \left(\frac{4t}{2t}\right) = \int_{t \to \infty}^{t} Z = Z$
to $\left(\frac{2t}{2t}\right) = \int_{t \to \infty}^{t} Z = Z$
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CALCULUS BC SECTION II, Part B Time—45 minutes

Number of problems-3

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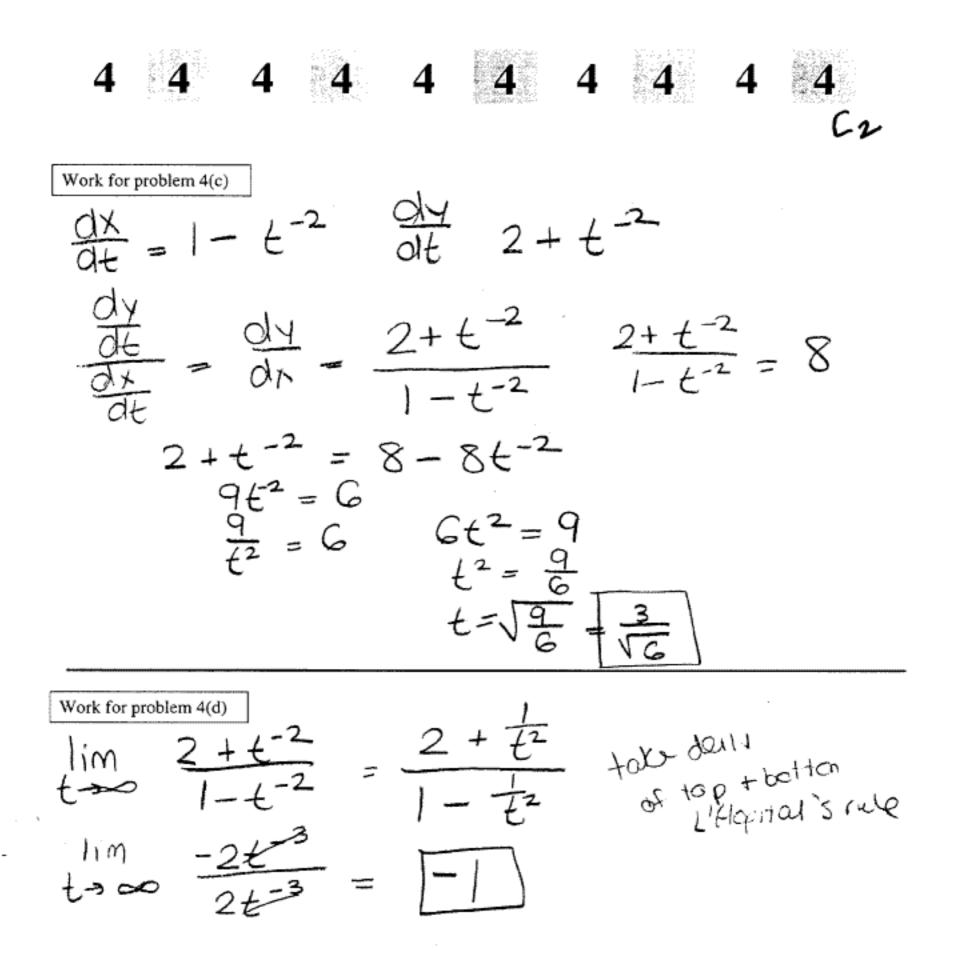


$$\frac{\text{Work for problem 4(b)}}{\text{Velocity}} = (1 - t^{-2}, 2 + t^{-2})$$

$$x(t) \qquad y(t) \qquad t=1$$

$$position (1 - t^{-2}) clt \qquad y(t) \qquad t=1$$

$$position (1 - t^{-2}) clt \qquad y(t) \qquad position (1 - t^{-2}) clt \qquad y(t) \qquad position (1 - t^{-2}) clt \qquad position (1 - t^{-2}) c$$



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CALCULUS BC SECTION II, Part B

Time—45 minutes

Number of problems-3

No calculator is allowed for these problems. =) v(t) = (x, y)a(t) = (dx, dy)Work for problem 4(a) $V(t) = (1 - \frac{1}{t^2}, 2 + \frac{1}{t^2})$ $a(t) = \left(\frac{1}{2t^3}, -\frac{1}{2t^3}\right)$ $a(3) = \left(\frac{1}{2(3)^3}, \frac{-1}{2(3)^3}\right)$ $a(3) = (\frac{1}{54}, \frac{1}{54})$ 1 - - 1' Work for problem 4(b) v(+)= (1-t2,2+t2) =) v(+) · (dr, du) p(1) = (x, y) P(t)=(+++, 2+-+) [P(3)= (313, 523)

Continue problem 4 on page 11.

4 4 4 4 4 4 4 4 4 4 4 4 4 4 Work for problem 4(c) $\frac{dy}{dx} = 8 = \frac{2 + \frac{1}{t^2}}{1 - \frac{1}{t^2}}$ $\frac{8}{t^2} = 2 + \frac{1}{t^2}$

$$6 = \frac{q}{t^2}$$

$$6 = \frac{q}{t^2}$$

$$6 = \frac{q}{t^2}$$

$$\frac{t^2 = q}{t^2 = \frac{3}{t^2}}$$

$$\frac{t^2 = \frac{3}{t^2}}{\frac{1}{t^2} = \frac{3}{t^2}}$$

Work for problem 4(d)

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