

AP[®] CALCULUS BC
2006 SCORING GUIDELINES (Form B)

Question 2

An object moving along a curve in the xy -plane is at position $(x(t), y(t))$ at time t , where

$$\frac{dx}{dt} = \tan(e^{-t}) \quad \text{and} \quad \frac{dy}{dt} = \sec(e^{-t})$$

for $t \geq 0$. At time $t = 1$, the object is at position $(2, -3)$.

- Write an equation for the line tangent to the curve at position $(2, -3)$.
- Find the acceleration vector and the speed of the object at time $t = 1$.
- Find the total distance traveled by the object over the time interval $1 \leq t \leq 2$.
- Is there a time $t \geq 0$ at which the object is on the y -axis? Explain why or why not.

AP Calculus BC
Unit 11 – Day 4 – Assignment

Name: _____

#’s 1 & 2: Plot the point in polar coordinates and find the corresponding rectangular coordinates for the point.

1) $(4, 3\pi/6)$	2) $(-4, -\pi/3)$
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#’s 3 & 4: The rectangular coordinates of a point are given. Plot the point and find two sets of polar coordinates for the point for $0 \leq \theta \leq 2\pi$.

3) $(1, 1)$	4) $(-3, 4)$
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#’s 5 – 8: Convert the rectangular equation to polar form.

5) $x^2 + y^2 = a^2$	6) $y = 4$
7) $3x - y + 2 = 0$	8) $y^2 = 9x$

#'s 9 – 12: Convert the polar equation to rectangular form.

9) $r = 3$	10) $r = \sin\theta$
11) $r = \theta$	12) $r = 3\sec\theta$

#'s 13 – 16: Name the type of polar curve. Graph the polar curve on your calculator and sketch the graph. Find an interval for θ over which the graph is traced only once.

13) $r = 3 - 4\cos\theta$	14) $r = 2 + \sin\theta$
15) $r = 2\cos(3\theta/2)$	16) $r^2 = 4\sin 2\theta$