4. [14 points]
A portion of the graph of the function \( j(t) \) is shown to the right. Note that, on the interval \( 2 \leq t \leq 4 \), the graph consists of a quarter of a circle that is centered at the point \((4, 1)\).

a. [6 points]

On the axes to the right, sketch a detailed graph of \( j'(t) \), the derivative of \( j(t) \), for \(-3 \leq t \leq 4\). Make sure that the following are clear from your graph:

- where \( j'(t) \) is undefined
- any vertical asymptotes of \( j'(t) \)
- where \( j'(t) \) is zero, positive, and negative
- where \( j'(t) \) is increasing, decreasing, and constant

b. [8 points]

Let \( J(t) \) be a continuous antiderivative of \( j(t) \) with \( J(-1) = -2 \). On the axes to the right, sketch a detailed graph of \( J(t) \) for \(-3 \leq t \leq 4\). Make sure that the following are clear from your graph:

- where \( J(t) \) is and is not differentiable
- the values of \( J(t) \) at \( t = -3, -2, -1, 0, 2, \) and 4
- where \( J(t) \) is increasing, decreasing, and constant
- where \( J(t) \) is linear (with correct slope)
- the concavity of \( J(t) \)