Practice Questions

1. What functions $y(t)$ have the constant derivative $s(t) = 7$?
2. What is the area from 0 to t under the graph of $s(t) = 7$?
3. From $t = 0$ to 2, find the integral $\int_0^2 7\, dt =$ _____.
4. What function $y(t)$ has the derivative $s(t) = 7 + 6t$?
5. From $t = 0$ to 2, find area = integral $\int_0^2 (7 + 6t)\, dt$.
6. At this instant $t = 2$, what is $\dfrac{d(\text{area})}{dt}$?

7. From 0 to t, the area under the curve $s = e^t$ IS NOT $y = e^t$.
If t is small, the area must be small. But $t = 0$ has $y = e^0 = 1$.
8. From 0 to t, the correct area under $s = e^t$ is $y = e^t - 1$.
The slope $\dfrac{dy}{dt}$ is _____ and now $y(0) =$ _____
9. Notice y_0 in $(y_1 - y_0) + (y_2 - y_1) + (y_3 - y_2) =$ _____.
The sum of $\Delta y = \dfrac{\Delta y}{\Delta t}\Delta t$ becomes the integral of $\dfrac{dy}{dt}dt$
The area under $s(t)$ from 0 to t becomes $y(t) - y(0)$.

Resource: Highlights of Calculus

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