

YOU MAY USE YOUR CALCULATOR BUT YOU MUST JUSTIFY ALL WORK USING ALGEBRA

Air is pumped into a balloon at 100 cm^3 per second. If the balloon maintains a spherical shape, how quickly is the surface area increasing when the radius is 5 cm ?

SCORE: ____ / 6 POINTS

Find parametric equations describing the portion of the curve $y = \sin x$ from $\left(\frac{\pi}{2}, 1\right)$ to $(0, 0)$.

SCORE: ____ / 4 POINTS

Simplify your answer.

Find the slope of the tangent line to the curve $\begin{matrix} x = t^3 - 2t \\ y = t^2 - 3t \end{matrix}$ at the point $(1, 4)$.

SCORE: ____ / 4 POINTS

Find the velocity and speed of an object whose position at time t is given by $\begin{matrix} x = \sin t \\ y = \sin 2t \end{matrix}$ each time the object passes through the origin.

SCORE: ____ / 6 POINTS