## Answer on Question \#62290-Physics-Atomic and Nuclear Physics

If an object has an initial position $(x 1, y 1)=(5.0 \mathrm{~m}, 9.0 \mathrm{~m})$, and an initial velocity $(\mathrm{v} 1 \mathrm{x}, \mathrm{v} 1 \mathrm{y})=(2.0 \mathrm{~m} / \mathrm{s},-9.0$ $\mathrm{m} / \mathrm{s}$ ), what is the final position vector ( $\mathrm{x} 2, \mathrm{y} 2$ ) of the object if its two-dimensional acceleration is described by the graphs in the figure below? (Express your answer in vector form in metres.)

## Solution

$$
\begin{gathered}
\boldsymbol{a}=\left(a_{x}, a_{y}\right) \\
\boldsymbol{p}_{\boldsymbol{f}}=\boldsymbol{p}_{\boldsymbol{i}}+\boldsymbol{v}_{\boldsymbol{i}} t+\boldsymbol{a} \frac{t^{2}}{2} \\
\boldsymbol{p}_{\boldsymbol{f}}=(5.0 \mathrm{~m}, 9.0 \mathrm{~m})+\left(2.0 \frac{\mathrm{~m}}{\mathrm{~s}},-9.0 \frac{\mathrm{~m}}{\mathrm{~s}}\right) t+\left(a_{x}, a_{y}\right) \frac{t^{2}}{2} .
\end{gathered}
$$

If you have the graphs in the figure then you can paste the values $a_{x}, a_{y}, t$ in this formula to obtain the answer in only numbers.

