1. Question Details

Water flows into an empty reservoir at a rate of $3000 + 800t$ liters per hour. What is the quantity of water in the reservoir after 5 hours? Click here for help on unit abbreviations.
An object moves up and down. Its position, \( y \), is a function of time, \( t \), with \( y \) in meters and \( t \) in seconds. The \textbf{velocity} of the object is

\[
\frac{dy}{dt} = 1.5 \sin(2t) \text{ m/s.}
\]

Guess a formula for \( y(t) \). Be sure to check your formula by differentiating it. Then use your formula to compute \( \Delta y \) on \([0, t]\). Ignore units.

\[
\Delta y = \rule{10em}{0.5pt}
\]

Suppose that you are also given

\( y(0) = 2.5 \text{ m} \)

Compute \( y(t) \). Your answer will be a formula involving \( t \).

\[
y(t) = \rule{10em}{0.5pt}
\]

What is the maximum height attained by this object? Give an exact numerical answer with units.

\[
y_{\text{max}} = \rule{10em}{0.5pt}
\]
3. Question Details

The voltage in a circuit is increasing. Its rate of change is
\[ \frac{dV}{dt} = 250e^{-2.5t} \text{ volts/sec.} \]

Guess a formula for \( V(t) \). Check your answer using derivative rules. Then use your formula to compute \( \Delta V \) on \([0, t]\). Ignore units.

\[ \Delta V = \]

Suppose that you are also given
\( V(0) = 20 \text{ volts.} \)

Compute \( V(t) \). Your answer will be a formula involving \( t \).

\( V(t) = \)

When will \( V = 60 \text{ volts? Be accurate to three decimal places and include units.} \)

\[ \]
An object is launched straight upward so that its height, \( h \), is a function of time, \( t \), with
\[
h(0) = 100 \text{ feet, and} \\
\frac{dh}{dt} = 50 - 32.2t \text{ feet/second.}
\]

Find a formula for \( h(t) \). Use the process from the previous two problems.
\[
h(t) =
\]

Find when \( h(t) = 0 \). Assume \( t > 0 \). Be accurate to three decimal places. Include units.
\[
t =
\]

At that instant, how fast is it moving? (Just as it hits, so not 0.) Be accurate to 2 decimal places. Include units.
\[

Assignment Details

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