5. The function \( v(t) = \sin^2 t \cos t \) is the velocity in m/sec of a particle moving along the x-axis from \([0, 2\pi]\). Use your calculator to answer the following.

a) Determine when the particle is stopped and when the particle is moving to the right and left.
\[
\begin{align*}
&x = 0, 1.570, 3.1415, 4.712 \Rightarrow \text{stopped} \\
&\uparrow & \uparrow & \uparrow \\
&\frac{\pi}{2} & \pi & \frac{3\pi}{2}
\end{align*}
\]

b) Find the particle's displacement for the given time interval.
\[
\int_{0}^{2\pi} v(t) \, dt =
\]

c) If \( s(0) = 3 \), what is the particle's final position?
\[
3 + \int_{0}^{2\pi} v(t) \, dt =
\]

d) Find the total distance traveled by the particle.
\[
\int_{0}^{2\pi} |v(t)| \, dt =
\]

10. The function \( v(t) = (t - 2) \sin t \) is the velocity in m/sec of a particle moving along the x-axis from \([0, 4]\). Use your calculator to answer the following.

a) Find the particle's displacement for the given time interval.
\[
\int_{0}^{4} (t-2)(\sin t) \, dt
\]

b) Find the total distance traveled by the particle.
\[
\int_{0}^{4} |v(t)| \, dt =
\]
A) The rate of potato consumption for a particular country was:
\[ C(t) = 2.2 + 1.1^t \]
where \( t \) is the number of years since 1970 and \( C \) is in millions of bushels per year.
Determine the amount of potatoes consumed from the beginning of 1972 to the end of 1973.

\[ \int_{2}^{3} |C(t)| = 3.469 \text{ million bushels} \]

B) The electrical power consumption (measured in kilowatts) at a factory \( t \) hours after midnight during a typical day is modeled by:
\[ E(t) = 300(2 - \cos(\pi t / 12)) \]
How many kilowatt hours of electrical energy does the company consume in a typical day.

\[ \int_{0}^{24} |E(t)| \, dt = \]