4. [7 points] After the success of his new bacon-flavored soda, Louis wants to try making a flavor that customers will find more refreshing in the hot summer months. Louis notices daily sales of his new spearmint soda vary seasonally. Sales reach a high of $300 around August 1 and a low of $120 around February 1. Suppose that daily sales of the soda (in dollars) can be modeled by a sinusoidal function $S(t)$ where $t$ is the time in months since January 1. Note that August 1 is seven months after January 1. You do not need to show work for this problem.

a. [2 points] What are the period and amplitude of the function $S(t)$?

\[
\text{Period} = \hspace{2cm} \text{Amplitude} = \hspace{2cm}
\]

b. [5 points] Write a formula for the function $S(t)$.

\[S(t) = \hspace{2cm}\]

5. [6 points] For which value(s) of $a$ is the following function continuous? Show all of your work.

\[
f(x) = \begin{cases} 
\frac{x^2 - 9}{x - 3} & \text{for } x < 3 \\
ax^2 + 2x + 15 & \text{for } x \geq 3 
\end{cases}
\]