SOLUTION: We have $t_2/t_3 = 1/8$ and $t_1/t_3 = 1/12$. Let $\text{sinc}\,(u) = \sin(u)/u$. The input signal has period t_3 and fundamental frequency $\omega_0 = 2\pi/t_3$. It's Fourier series is

$$\begin{aligned}
x(t) &= \sum_{n=-\infty}^{\infty} c_n e^{jn\omega_0 t} \\
c_n &= \frac{1}{t_3}\int_{-t_3/2}^{t_3/2} x(t)e^{-jn\omega_0 t}dt \\
&= \frac{1}{t_3}\left[\int_{-t_2}^{t_2} Ae^{-jn\omega_0 t}dt - \int_{-t_1}^{t_1} Ae^{-jn\omega_0 t}dt\right] \\
&= \frac{2A}{t_3}\left[t_2\text{sinc}\,(n\omega_0 t_2) - t_1\text{sinc}\,(n\omega_0 t_1)\right] \\
&= \frac{2A}{t_3}\left[t_2\text{sinc}\,(2\pi n t_2/t_3) - t_1\text{sinc}\,(2\pi n t_1/t_3)\right] \\
&= \frac{A}{12}\left[3\text{sinc}\,(\pi n/4) - 2\text{sinc}\,(\pi n/6)\right] \\
c_0 &= A/12 \\
c_1 = c_{-1} &= \frac{A}{12}\left(\frac{3\sqrt{2}/2}{\pi/4} - \frac{2(1/2)}{\pi/6}\right) = \frac{A}{2\pi}(\sqrt{2}-1)
\end{aligned}$$

Note that $h(t) = (B/t)\sin(1.5\omega_0 t)$. The LTI system is a low pass filter with frequency response

$$H(\omega) = \begin{cases} B\pi & \text{if } |\omega| < 1.5\omega_0 \\ 0 & \text{else} \end{cases}$$

so in the Fourier series for $x(t)$, only the terms corresponding to $n = -1, 0, 1$ pass through the filter. Thus,

$$\begin{aligned}
y(t) &= B\pi \sum_{n=-1}^{1} c_n e^{jn\omega_0 t} \\
&= B\pi\left(c_0 + c_1 e^{j\omega_0 t} + c_{-1}e^{-j\omega_0 t}\right) \\
&= B\pi\left(c_0 + 2c_1\cos(\omega_0 t)\right) \\
&= AB\left(\frac{\pi}{12} + (\sqrt{2}-1)\cos(2\pi t/t_3)\right)
\end{aligned}$$