Q1. (a) Given that $g(x) = -6 + \int_{-3}^{x} f(t)dt$ for $g(x) = 0$ to be true $\int_{-3}^{x} = 6$ must be true. To start, we can solve $\int_{-3}^{x} = 6$ for x as shown below:

$$\begin{aligned} \int_{-3}^{x} f(t)dt &= 6 \\ f(x) - f(-3) &= 6 \\ f(x) &= 6 \end{aligned}$$

As area C has an area greater than 6 its height must exceed 6 and therefore there exists x such that $x \in [-3, 2]$ where $g(x) = 0$

(b)

(c)

Q2.