

1. Consider the following function.

$$S(x) = \begin{cases} x + 1, & -2 \leq x \leq -1 \\ x^3 - 2x + 1, & -1 \leq x \leq 1 \\ x - 1, & 1 \leq x \leq 2 \end{cases}$$

- (a) List the needed conditions for  $S(x)$  to be a natural cubic spline.

- (b) List all ways in which  $S(x)$  fails to be a natural cubic spline.