

Homework #1 Solution

To make $h(x)$ continuous at $x=1$ we need $\lim_{x \rightarrow 1} h(x) = h(1) = 4$.

$$\text{Now } \lim_{x \rightarrow 1^-} h(x) = \lim_{x \rightarrow 1^-} c x^2 \stackrel{\text{D.S.P}}{=} c(1)^2 = c$$

$$\text{and } \lim_{x \rightarrow 1^+} h(x) = \lim_{x \rightarrow 1^+} (-x^3 + mx) \stackrel{\text{D.S.P}}{=} -(1)^3 + m(1) = -1 + m$$

Since $\lim_{x \rightarrow 1} h(x) = 4$ it follows that $\lim_{x \rightarrow 1^-} h(x) = \lim_{x \rightarrow 1^+} h(x) = 4$.

This means that $c=4$ and $-1+m=4$ so that $m=5$.