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**MA386 - Introduction to Numerical Analysis**  
**Homework Assignment 4, 100 points**  
**Due In Class October 10**

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For some problems below, I suggest you use MATLAB or Mathematica. If you do, please included a printout of your work.

1. Does the function below form a cubic spline? Why or why not?

$$S(x) = \begin{cases} 2x^3 + x^2 + 4x + 5, & x \in [0, 1] \\ (x - 1)^3 + 7(x - 1)^2 + 12(x - 1) + 12, & x \in [1, 2] \end{cases}$$

2. Section 3.4: 16.

3. Section 3.4: 18.

4. This problems is to be done by hand: Find a one-piece Bézier curve that has vertical tangents at its endpoints  $(-1, 0)$  and  $(1, 0)$  and that passes through  $(0, 1)$ . Why can't we construct such a curve with cubic splines?