Solutions to Questions on Worksheet 6
Splines and Least Squares Fitting

1. For Problem 1 write down the cubic spine found in the worksheet:

$$
S(x) = \begin{cases}
6 - 0.9467x - 0.4324x^3 & 0 \leq x \leq 1 \\[2mm]
4.6209 - 2.2439(x-1) - 1.2972(x-1)^2 + 0.6717(x-1)^3 & 1 \leq x \leq 2 \\[2mm]
1.7516 - 2.8231(x-2) + 0.7181(x-2)^2 + 0.3835(x-2)^3 & 2 \leq x \leq 3 \\[2mm]
0.0300 - 0.2366(x-3) + 1.8684(x-3)^2 - 0.6228(x-3)^3 & 3 \leq x \leq 4
\end{cases}
$$

[*3 mark*]

   Find $S(2.5) = 0.5675$ [*1 mark*]

2. For Problem 2 write down the linear fit: $y = -0.3545x + 1.0550$ [*1 mark*]

3. From Problem 5 write down the cubic fit

$$
y = p_3(x) = -0.0503x^3 - 0.3011x^2 - 0.0067x + 1.0004
$$

[*2 mark*]

4. From Problem 7 write down the values of r^2 for:

   (a) the linear fit in Problem 2:   0.9190   [*1 mark*]

   (b) the cubic fit in Problem 5:   1.0000   [*1 mark*]

   Which of these, (a) or (b), gives the best fit to the given data: (b)   [*1 mark*]