

Supplemental problems: §2.2, §2.3

1. Put an augmented matrix into reduced row echelon form to solve the system

$$x_1 - 2x_2 - 9x_3 + x_4 = 3$$

$$4x_2 + 8x_3 - 24x_4 = 4.$$

2. We can use linear algebra to find a polynomial that fits given data, in the same way that we found a circle through three specified points in the §2.1 Webwork.

Is there a degree-three polynomial $P(x)$ whose graph passes through the points $(-2, 6)$, $(-1, 4)$, $(1, 6)$, and $(2, 22)$? If so, how many degree-three polynomials have a graph through those four points? We answer this question in steps below.

- a) If $P(x) = a_0 + a_1x + a_2x^2 + a_3x^3$ is a degree-three polynomial passing through the four points listed above, then $P(-2) = 6$, $P(-1) = 4$, $P(1) = 6$, and $P(2) = 22$. Write a system of four equations which we would solve to find a_0 , a_1 , a_2 , and a_3 .
- b) Write the augmented matrix to represent this system and put it into reduced row-echelon form. Is the system consistent? How many solutions does it have?