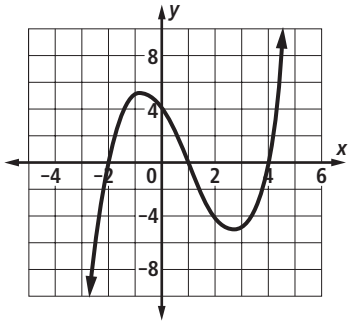
Name

11-8A Lesson Master

Questions on SPUR Objectives
See Student Edition pages 792–795 for objectives.

SKILLS Objective D

1. The graph at the right shows a polynomial of the form $P(x) = ax^3 + bx^2 + cx + d$. It contains the points $(-2, 0)$, $(0, 4)$, $(1, 0)$, and $(3, -5)$.



   a. Use the four points to write a system of four equations that can be used to solve for a, b, c, and d.

   b. Solve your system to find the coefficients a, b, c, and d. Write an equation for $P(x)$.

   c. Verify your answer by using the equation to find $P(3)$ and $P(5)$.

USES Objective H

2. Find a polynomial $S(n)$ that gives the sum of the first n perfect squares. Use these data:

$S(1) = 1^2 = 1$

$S(2) = 1^2 + 2^2 = 5$

$S(3) = 1^2 + 2^2 + 3^2 = 14$

$S(4) = 1^2 + 2^2 + 3^2 + 4^2 = 30$

$S(5) = 1^2 + 2^2 + 3^2 + 4^2 + 5^2 = 55$

$S(6) = 1^2 + 2^2 + 3^2 + 4^2 + 5^2 + 6^2 = 91$

3. A common task in computer science is sorting a list of items. To be efficient, computer scientists try to reduce the number of times two items in a list are compared. The total number of comparisons depends on the number of items in the list. The number of comparisons needed by *selection sort*, a common algorithm, is given below.

Items in List	10	20	30	40	50
Number of Comparisons	45	190	435	780	1225

   a. Find a polynomial model that fits these data.

   b. Use your model to predict the number of comparisons needed to sort a list with 1000 items.