4-8

Practice

Modeling Real-World Data with Polynomial Functions

Write a polynomial function to model each set of data.

1. The farther a planet is from the Sun, the longer it takes to complete an orbit.

Distance (AU)	0.39	0.72	1.00	1.49	5.19	9.51	19.1	30.0	39.3
Period (days)	88	225	365	687	4344	10,775	30,681	60,267	90,582

Source: *Astronomy: Fundamentals and Frontiers*, by Jastrow, Robert, and Malcolm H. Thompson.

2. The amount of food energy produced by farms increases as more energy is expended. The following table shows the amount of energy produced and the amount of energy expended to produce the food.

Energy Input (Calories)	606	970	1121	1227	1318	1455	1636	2030	2182	2242
Energy Output (Calories)	133	144	148	157	171	175	187	193	198	198

Source: *NSTA Energy-Environment Source Book.*

3. The temperature of Earth's atmosphere varies with altitude.

Altitude (km)	0	10	20	30	40	50	60	70	80	90
Temperature (K)	293	228	217	235	254	269	244	207	178	178

Source: *Living in the Environment*, by Miller G. Tyler.

4. Water quality varies with the season. This table shows the average hardness (amount of dissolved minerals) of water in the Missouri River measured at Kansas City, Missouri.

Month	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Hardness ($CaCO_3$ ppm)	310	250	180	175	230	175	170	180	210	230	295	300

Source: *The Encyclopedia of Environmental Science*, 1974.