REAL-WORLD RATIONAL EXPONENTS

Kepler Industries, Inc.

Planet	Orbital Period (days)	Average Distance (km)
Mercury	87.96	
Venus	224.68	
Earth	365.26	
Mars	686.98	
Formula:	$d =$	

You just started a job at Kepler Industries, Inc., where you have been asked to determine the average distance of each planet from the sun using the given table of observed data containing each planet's orbital period (the time it takes to make one lap around the sun). The formula $P = \frac{1}{k} \cdot d^{\frac{3}{2}}$ models the relationship between the orbital period, P, and the average distance from the planet to the sun, d. In our solar system, k is approximately 5×10^9. Rather than plugging in each value of P and finding the average distance over and over for each planet, you notice it would be more efficient to solve the equation for d and then plug in each value of P. Solve the formula for d and then complete any two rows of the table.

Depreciation

Your uncle is helping you save up for your first car by letting you work with him at his used car lot. Before he buys a used car, he needs to know how much it is worth. He lets you in on a little trade secret: The annual rate of depreciation of a car, r, can be modeled by the formula $r = 1 - \left(\frac{V}{C}\right)^{\frac{1}{n}}$, where C is the original cost of the car and V is the value of the car after n years. A car originally sells for $25,000 and has an annual depreciation rate of 11%. Help your uncle determine the value of the car after 5 years. Round your answer to the nearest cent.