Unit 1 Part 2: Lesson 2 Estimating Roots

Estimate $\sqrt[3]{989}$ to the nearest integer.

The largest perfect cube less than 989 is 729. $\sqrt[3]{729} = 9$

The smallest perfect cube greater than 989 is 1,000. $\sqrt[3]{1000} = 10$

$729 < 989 < 1{,}000$ Write an inequality.

$9^3 < 989 < 10^3$ $729 = 9^3$ and $1{,}000 = 10^3$

$\sqrt[3]{9^3} < \sqrt[3]{989} < \sqrt[3]{10^3}$ Find the cube root of each number.

$9 < \sqrt[3]{989} < 10$ Simplify.

So, $\sqrt[3]{989}$ is between 9 and 10. Since 989 is closer to 1,000 than 729, the best integer estimate for $\sqrt[3]{989}$ is 10.

STEM The formula $t = \frac{\sqrt{h}}{4}$ represents the time t in seconds that it takes an object to fall from a height of h feet. If a rock falls from a height of 125 feet, estimate how long it will take to reach the ground.

$t = \frac{\sqrt{h}}{4}$ Write the equation.

$= \frac{\sqrt{125}}{4}$ Replace h with 125.

$\approx \frac{11}{4}$ or 2.75 Estimate the square root to the nearest integer. Simplify.

So, it will take about 2.75 seconds for the rock to reach the ground.