2.2 Power Functions with Modeling

What you’ll learn about

- Power Functions and Variation
- Monomial Functions and Their Graphs
- Graphs of Power Functions
- Modeling with Power Functions

... and why
Power functions specify the proportional relationships of geometry, chemistry, and physics.

Let’s practice this definition:

Example 1: Determine if the function is a power function. For those that are not, explain why not.

(a) \( f(x) = -3x \)  
(b) \( f(x) = \sqrt{x} \)  
(c) \( f(x) = 7x^2 \)  
(d) \( f(x) = 2x^3 \)
Now, you write a Power Function Formula from a word problem.

See some examples from Geometry & Science on page 174. How do you know the difference between direct variation and inverse variation?

Example 1: The volume $V$ of a sphere varies directly as the cube of the radius $r$. When the radius of a sphere is 6 cm, the volume is $304.49$ cm$^3$. What is the radius of a sphere whose volume is 268.083 cm$^3$?

Example 2: The force of gravity $F$ acting on an object is inversely proportional to the square of the distance $d$ from the object to the center of the earth. Write an equation that models this situation.

Use the definition to Analyze Power Functions:

You Try:

\[ f(x) = \sqrt[3]{x} \quad g(x) = \frac{1}{x^2} \]

More Analyzing Power Functions...Consider This:

Example 4: Value and brightness of a light bulb are related by the power function $P(V) = \frac{1}{3}V^3$. What is the power of a 100-watt light bulb?

Example 3: The intensity of light $I$ is inversely proportional to the square of the distance $d$ from the light source. Write an equation that models this relationship.

More Analyzing Power Functions...Consider This:

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For the upcoming Skills Assessment, you will be asked to analyze Power functions and also run a regression for a power function.

To prep for that: Read examples 5 & 6 on page 179 and then do #55

Create a "Cheat Sheet" over these two lessons that you wish with all of your heart Mrs. Fugate would let you use on the Skills Assessment tomorrow.

*Remember! Tomorrow's assessment will have old 1.5 & 1.6 skills on it.

To make sure you've mastered the objectives...

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