

Bellwork

Answer each of the following questions:

1. What is a function rule?

2. How can you distinguish between which type of function rule to use when setting up equations?

Creating and Solving Equations

Types of Equations:

1. Linear (Covered in Math I)
2. Quadratic (Covered in Unit 2A, 2B, & 2C)
3. Exponential (Covered in Unit 3)

At the moment we will be only working with the basics of each of these functions.

- Setting them up
- Plugging in values for every variable but one of them and solving for it.

Linear Equations

Point-Slope Form:

$$y - y_1 = m(x - x_1)$$

Where...

(x_1, y_1) is a point on the line

m = Slope of the line

= Rate of Change

Slope-Intercept form:

$$y = mx + b$$

Where...

(x, y) a point on the line.

m = Slope of the line

= Rate of Change

b = y-intercept

Slope-Intercept Form

Main Equation of Focus

What to look for in the story problem:

- Find the item that represents the rate.
- Is the rate constant?

Procedure:

- Step 1: Write the equation $y = mx + b$
- Step 2: Fill in for m (This is the given rate)
- Step 3: Fill in for b
(This is the initial amount)

Example

1. The students in Mr. Brewer's class are going to help purchase supplies to help the students at Maple out and each of them are going to bring in \$5.00 each. The teachers have already gathered together \$850. Set up an equation showing how much the students will raise, A , if n students donate.

Example Continued

Using the answer from the question on the last page ($A = 5n + 850$), how many students would need to bring in their money to collect \$1500?

Example

2. The technology committee purchases Chromebooks for students to use throughout the district. The school makes an initial investment of \$10,000 and rents them out to students for \$100 per year. Write an equation showing the amount of money made, $A(n)$, if the school has n students rent the Chromebooks per year.

Example Continued

Using the answer from the question on the last page ($A(n) = 100n - 10,000$), how many students will need to rent the Chromebooks so the district replaces all of the money they invested in them?

Exponential Equations

General Exponential Equation:

$$y = ab^x$$

Where...

a = The initial amount

b = The multiplier

x = a fraction representing the number of times multiplied divided by the time it takes in hours.

Exponential Equations

What to look for in the story problem:

- Look for key words like doubles, triples, half-life, etc.

Procedure:

- Step 1: Identify the initial amount given.
- Step 2: Identify the multiplier.
- Step 3: Identify the exponent by figuring out how many multipliers occur per number of hours.
- Step 4: Plug into the general equation.

Example

3. A recently discovered strain of bacteria is found to double every 20 minutes. Write an equation that will model the population, p , of the bacteria after t hours if we have found 5 micrometers of the bacteria to begin with.

Example Continued

Using the previous equation ($P = 5(2)^{3t}$), how many micrometers are present after 2 hours of not being treated?

Quadratic Equations

General Quadratic Equation:

$$y = ax^2 + bx + c$$

Equation for Falling Objects:

$$h(t) = -16t^2 + v_0t + h_0$$

Where...

v_0 = The initial velocity of the object

h_0 = The initial height of the object

Quadratic Equations

What to look for in the story problem:

- Find the initial velocity of the object.
- Find the initial height of the object.

Procedure:

- Step 1: Identify the value of v_0
- Step 2: Identify the value of h_0
- Step 3: Set up the general equation and plug in the values of v_0 and h_0 .
(NOTE: Remove v_0 and h_0 and plug in the values identified.)

Example

4. The height of an object thrown or dropped can be found by plugging into the equation $h(t) = -16t^2 + v_0t + h_0$.

Write the equation of an object thrown from 500 feet below the ground at 100 feet per second.

Example Continued

Using the equation from the previous page

$(h(t) = -16t^2 + 100t - 500)$, will the object

ever get above ground if the object reaches

its peak after just 3.125 seconds?

Example

5. The height of an object thrown or dropped can be found by plugging into the equation $h(t) = -16t^2 + v_0t + h_0$.

Write the equation of an object dropped from 5500 feet above the ground.

Example Continued

Using the equation from the previous page

$(h(t) = -16t^2 + 5500)$, how high is the

object after 25 seconds?