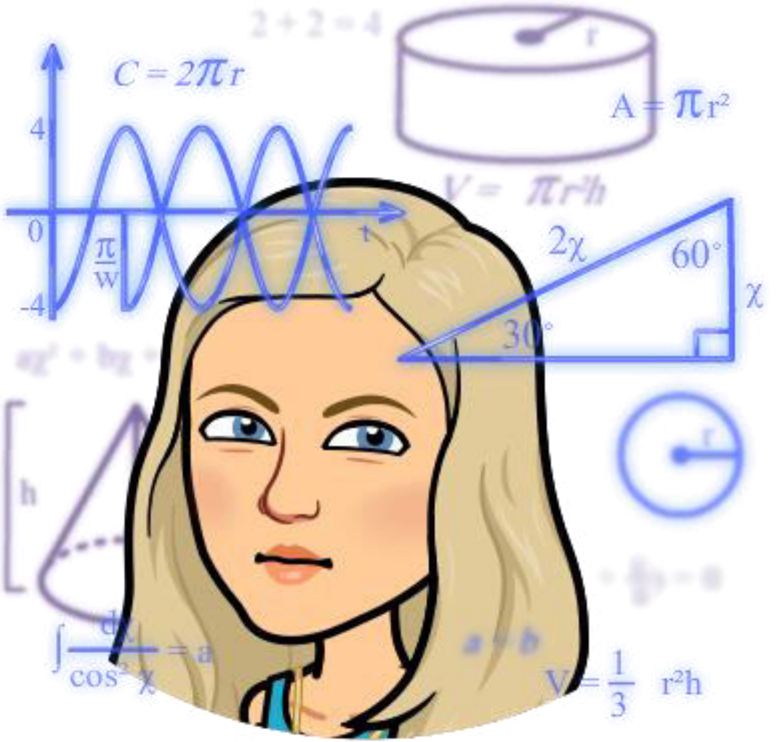
Today’s Materials

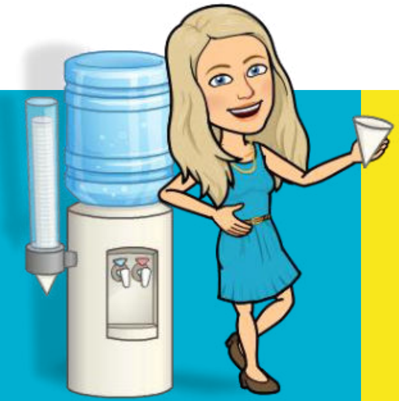


Writing Inverse Functions to Solve Problems

Lesson 17

17.1 Water in a Tank

5 minutes → Pg 33

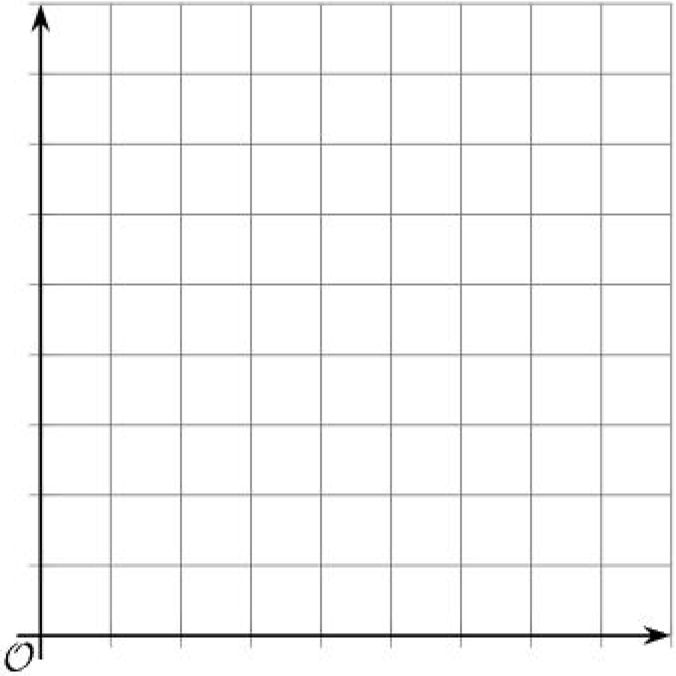


Wrapping your head around the scenario:
This tank filled with 80 liters of water!

17.1: Water in a Tank

A tank contained some water. The function w represents the relationship between t, time in minutes, and the amount of water in the tank in liters. The equation $w(t) = 80 - 2.5t$ defines this function.

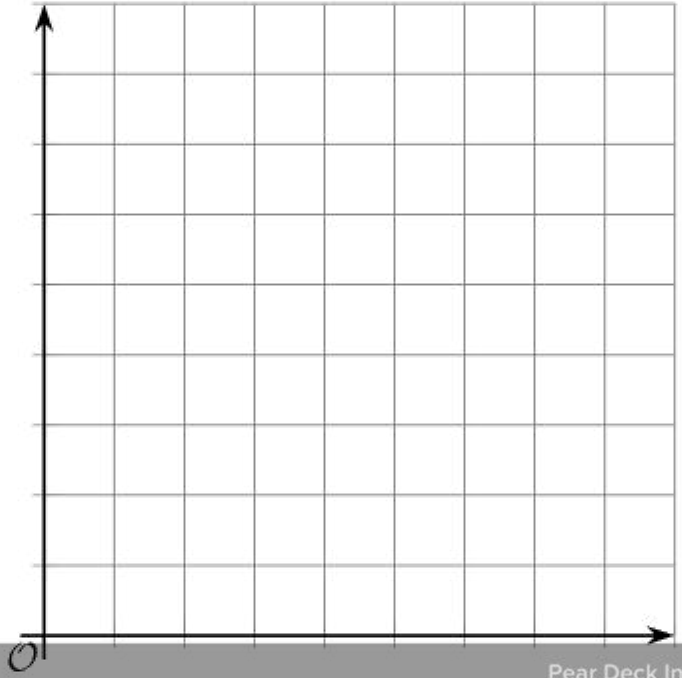
1. Discuss with a partner:
   a. How is the water in the tank changing? Be as specific as possible.
   b. What does $w(t)$ represent? Is $w(t)$ the input or the output of this function?
2. Sketch a graph of the function. Be sure to label the axes.



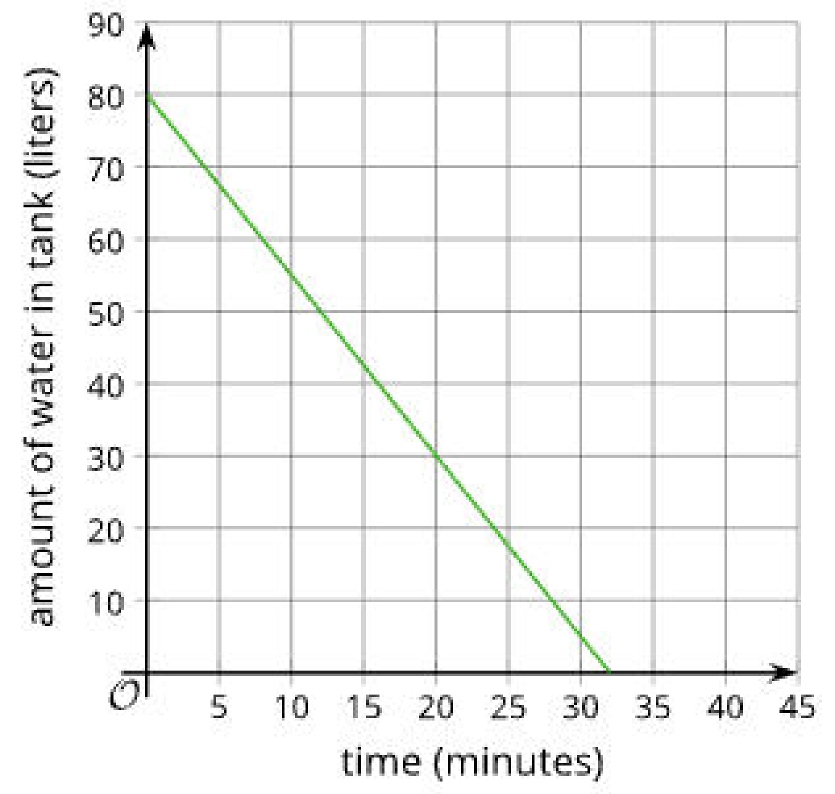
17.1: Water in a Tank

A tank contained some water. The function w represents the relationship between t, time in minutes, and the amount of water in the tank in liters. The equation $w(t) = 80 - 2.5t$ defines this function.

Sketch your graph!



How’d it go?



amount of water in tank (liters)
90
80
70
60
50
40
30
20
10
O
5
10
15
20
25
30
35
40
45
time (minutes)

Synthesis

$w(t) = 80 - 2.5t, w(t)$ is the output when the input is t

Let's use inverse functions to solve problems!

Today's Goals

- I can write a linear function to model given data and find the inverse of the function.

- When given a linear function defined using function notation, I know how to find its inverse.

17.2: Another Look at the Tank

10 minutes → Pg 33 & 34

Co-Craft Questions

17.2: Another Look at the Tank

A tank contained 80 liters of water. The function w represents the relationship between t, time in minutes, and the amount of water in the tank in liters. The equation $w(t) = 80 - 2.5t$ defines this function.

What are some mathematical questions we could ask?

On whiteboards, think through / show work for #1, 2, 3, 4 & 5

Synthesis ↠ Inverse

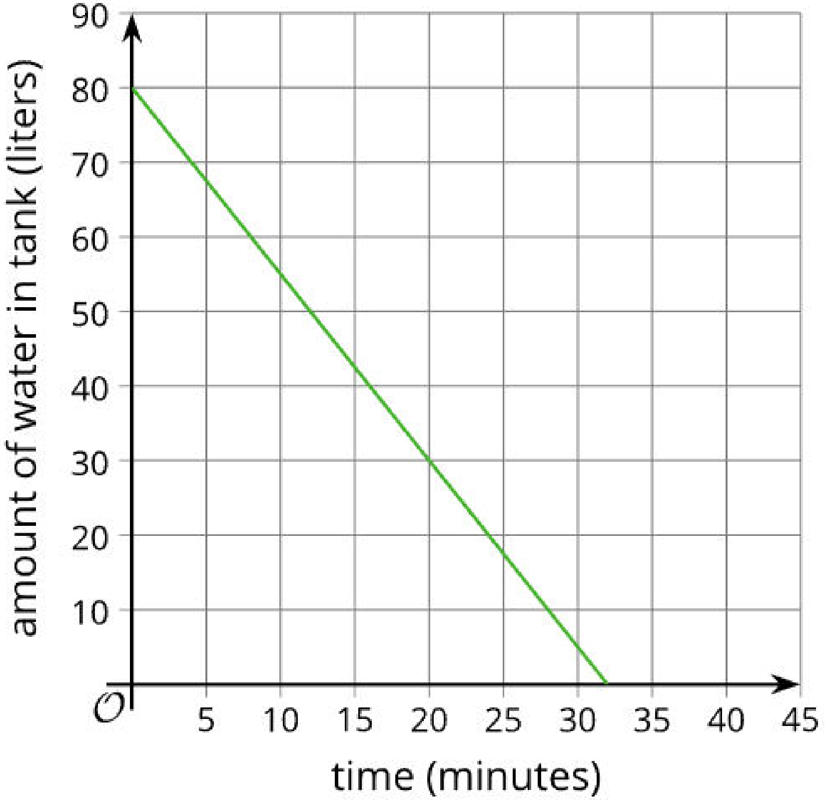
$$t = \frac{80 - w(t)}{2.5}$$

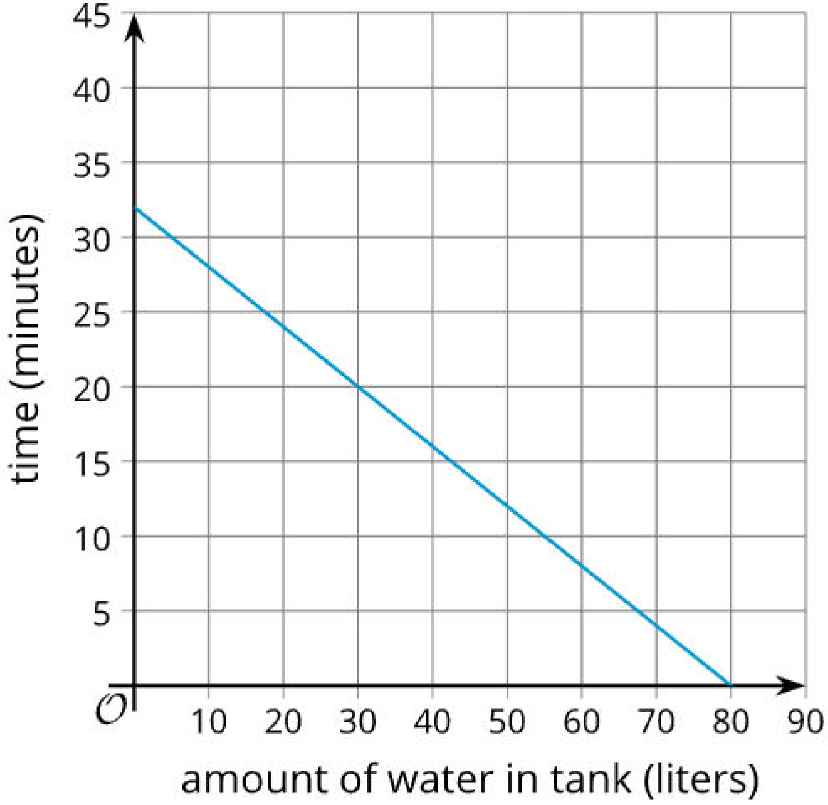
Let's say...

$$r = w(t)$$

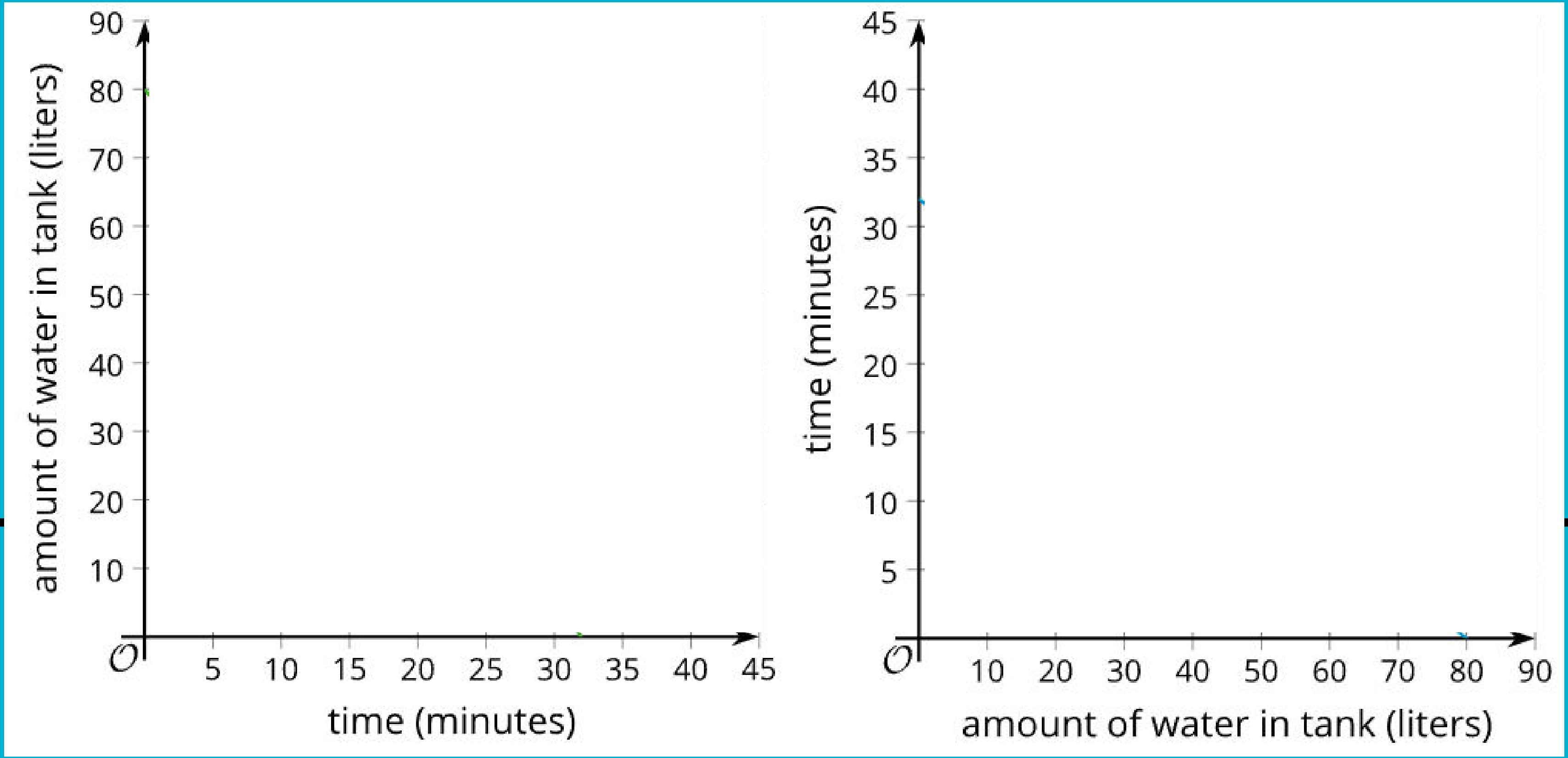
$$t = \frac{80 - r}{2.5}$$

Synthesis ↣ Inverse





Synthesis ↠ Inverse



17.3: Phones in Homes

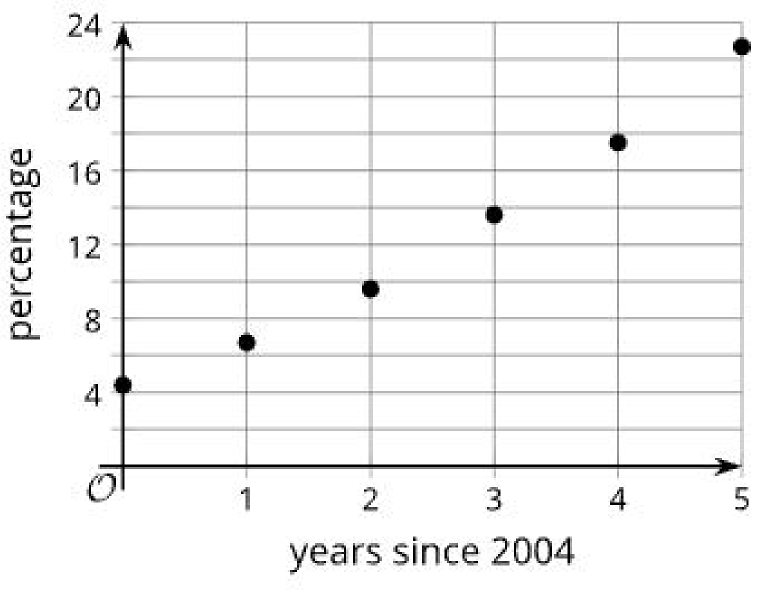
20 minutes → Pg .

17.3: Phones in Homes

In 2004, less than 5% of the homes in the U.S. relied only on a cell phone. Since then, the percentage of homes that used only cell phones have increased.

Here are the percentages of homes with only cell phones from 2004 to 2009.

years since 2004	percentages
0	4.4
1	6.7
2	9.6
3	13.6
4	17.5
5	22.7



On whiteboards, think through / show work for #1, 2, 3 & 4

Synthesis ↣ Inverse

Solving for *t* is the same as writing the inverse of the original function

$$P(t) = 3.6t + 3.5$$
$$P(t) - 3.5 = 3.6t$$
$$\frac{P(t) - 3.5}{3.6} = t$$

Lesson Synthesis ➻ Inverse

In this lesson, we saw some real-world situations where it was useful to find the inverse of a function.

How can the inverse of a function help us solve problems?

Students, write your response!

Did we meet our goals?

- I can write a linear function to model given data and find the inverse of the function.

- When given a linear function defined using function notation, I know how to find its inverse.

17.4: Time on the Trail

5 minutes → Cool Down