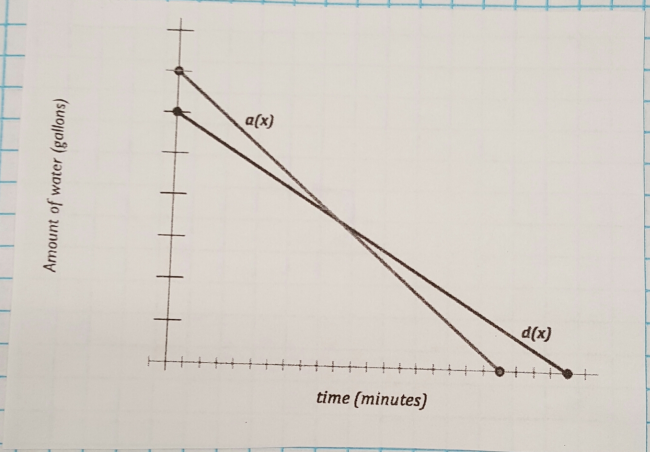
Class Notes 3.4 (Get glue-in from Mrs. Izatt)

3.4 The Water Park

Compare functions and their inputs and outputs

Situation: Aly and Dayne work at a water park. Each month they drain two different pools using pumps. Below, a(x) represents the draining of Aly's pool and d(x) is Dayne's.

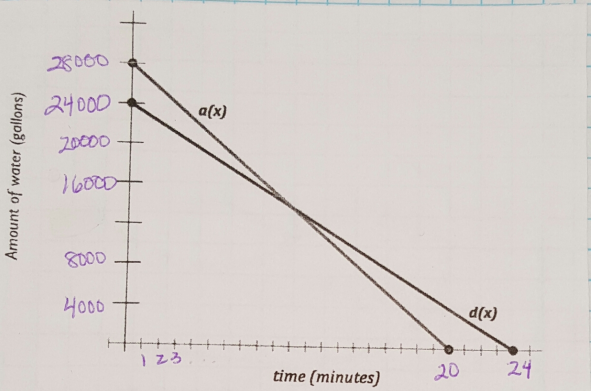


What do we notice about the graphs?

- They are linear
- They are decreasing.
- Aly's pool starts with more water than Dayne's.
- Aly's pump works faster than Dayne's.
- There is a point when they have the same amount of water in both pools.

Next: Label the graph using the following information to help you.

Dayne's pump can drain 1000 gallons per minute and it takes 24 minutes to drain his pool.



If it takes 24 min. and the pump drains 1000 gallons per min, then

$24 \times 1000 = 24000$ gallons when he started

Since there are 6 hash marks on the graph going up to 24000, then each hash mark is worth 4000. $(24000 \div 6 = 4000)$

Equation for Dayne's pool

$d(x) = 24000 - 1000x$ or $dx = -1000x + 24000$

- 24000: Gallons started with (y int)
- 1000: slope rate of the pump
- 24000: Gallons started with (y int)

Domain - [0, 24]

Range [0, 24000]

Function for Aly's pool:

$a(x) = 28000 - 1400x$

Starting amount of water

slope

$\frac{28000 \text{ gallons}}{20 \text{ min.}} = 1400 \text{ gal/min}$

Domain $[0, 20]$ Range $[0, 28000]$

7. When is $a(x) = d(x)$? What does this mean?

By looking at the graph, the two lines seem to intersect at about $x = 10$. We check that by using 10 as x.

$d(10) = 24000 - 1000(10) = 24000 - 10000 = 14000$

$a(x) = 28000 - 1400(10) = 28000 - 14000 = 14000$

So, at 10 minutes, they both have 14000 gallons of water in their pools.

8. $a(10) = 14000$. At 10 minutes, Aly's pool has 14000 gallons

9. If $d(x) = 2000$, then $x = 22$. [Either look at the graph or solve the equation $2000 = 24000 - 1000x$

10. When is $a(x) > d(x)$? On the interval $[0, 10)$ This means that Aly's pool has more water than Dayne's up until 10 minutes has passed.