

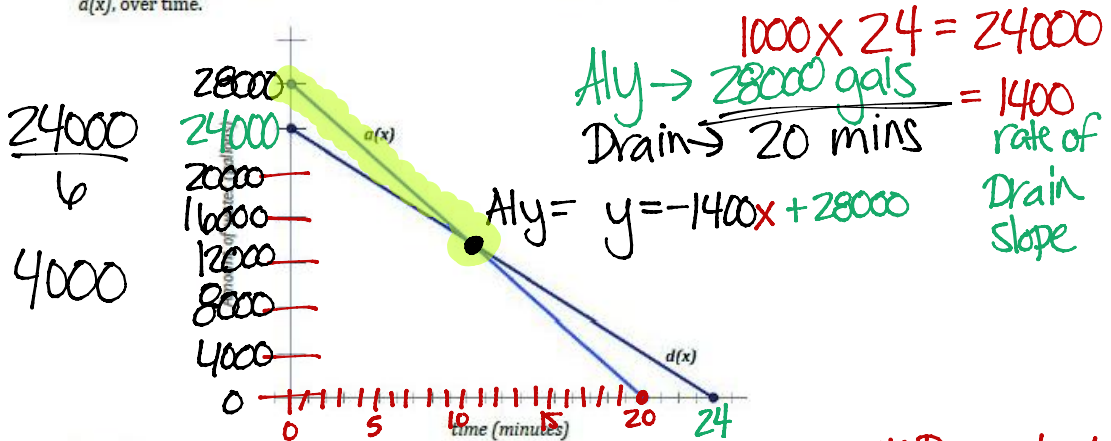
### 3.4 The Water Park

### A Solidify Understanding Task



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<https://filic.ker/olsBG8DX>

Aly and Dayne work at a water park and have to drain the water at the end of each month for the ride they supervise. Each uses a pump to remove the water from the small pool at the bottom of their ride. The graph below represents the amount of water in Aly's pool,  $a(x)$ , and Dayne's pool,  $d(x)$ , over time.



## Part I

1. Make as many observations as possible with the information given in the graph above.

\* Dayne has less water

\* Both Decrease \* Both Continuous \* Both Linear  
\* Aly has more water and drains faster than Dayne.  
\* Dayne takes longer to drain water

## Part II

Dayne figured out that the pump he uses drains water at a rate of 1000 gallons per minute and takes 24 minutes to drain.

2. Write the equation to represent the draining of Dayne's pool,  $d(x)$ . What does each part of the equation mean?

takes 24 minutes to drain.

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$y = -100x + 24000$

mins

Amt of water @ any time

Slope-Rate of change → how fast it drains

y-int gallons of water you start with

3. Based on this new information, correctly label the graph above.

4. For what values of  $x$  make sense in this situation? (Use interval notation to write the domain of the amount of water in Dayne's pool).

time, mins

24 minutes - empty

0 minutes - Full

$$[0, 24]$$

$$0 \leq x \leq 24$$

5. Determine the range, or output values, that make sense in this situation. (Use interval notation to write the range of the amount of water in Dayne's pool).

pool full = 24000 gals

empty = 0 gals

Gallons of water

$$[0, 24,000]$$

$$0 \leq y \leq 24,000$$

6. Write the equation used to represent the draining of Aly's pool,  $a(x)$ . Using interval notation, state the domain and range for the function,  $a(x)$  as well as the domain and range of the situation. Compare the two domains by describing the constraints made by the situation.

Amt of water @ any time

$$y = -1400x + 28000$$

Drain rate  
Slope  
lose/min

water @ beginning

Dom. minutes  $[0, 20]$

$$0 \leq x \leq 20$$

Part III

\*Aly finishes 1st - lower time Range: gal of water  $[0, 28,000]$

\*Aly has more water  $\rightarrow$  higher amount  $0 \leq y \leq 28,000$

Based on the graph and corresponding equations for each pool, answer the following questions.

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

@ 10 mins

At 10 mins, Aly and Dayne's pools have same Amt of water.

8. Find  $a(5)$ . What does this mean?

Gallons of water in Aly's pool at 5 mins

9. If  $d(x) = 2000$ , then  $x = \underline{\hspace{1cm}}$ . What does this mean?

How many minutes until Dayne's pool has 2000 gallons

$$\frac{-1400(5) + 28000}{21000 \text{ gallons}}$$

10. When is  $a(x) > d(x)$ ? What does this mean?

When is Aly's water is greater than Dayne's water?

$$\begin{aligned} -1000x + 24000 &= 2000 \\ -24000 &-24000 \end{aligned}$$

$$\frac{-1000x}{-1000} = \frac{-22000}{-1000} \quad \boxed{x = 22 \text{ mins}}$$

From 0 mins to 10 mins

From 28000 gals to  $\approx 14000$  gallons

$$\begin{aligned} -1400x + 28000 &= -1000x + 24000 \\ +1400x &+1400x \end{aligned}$$

$$\begin{aligned} 28000 &= 400x + 24000 \\ -24000 &-24000 \end{aligned}$$

$$\frac{4000}{400} = \frac{400x}{400} \quad \boxed{x = 10 \text{ mins}}$$

$$-1400(10) + 28000$$

$$-14000 + 28000$$

$$\boxed{14000 \text{ gals}}$$