

## General Algebra II Worksheet #6 Unit 6 Selected Solutions Page 1

A rectangular water tank is 8 feet long, 6 feet wide, and 5 feet deep. The tank is full initially and water is drained out of the tank at 12 cubic feet per minute until the tank is empty. Let  $t$  represent the time that water has been draining out of the tank (in minutes). Let  $F(t)$  represent the depth of the water in the tank (in inches). Answer each of the following. Show your process neatly organized.

9. How long will it take to empty the tank? 20 minutes

$V = LWH = (8 \text{ ft.})(6 \text{ ft.})(5 \text{ ft.}) = 240$  cubic feet. 240 cubic feet must be drained to empty the tank.

Time = (240 cubic feet)  $\div$  (12 cubic feet per minute) = 20 minutes

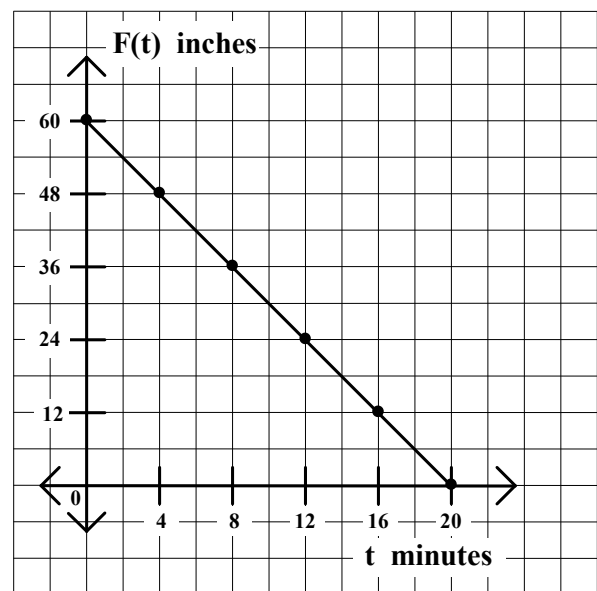
10. Make a table giving  $t$  and  $F(t)$  every 4 minutes from  $t = 0$  until the tank is empty.

$t$	$F(t)$	
0	60	← full tank
4	48	
8	36	
12	24	
16	12	
20	0	← empty tank

The depth decreases 60 inches in 20 minutes. It decreases at 3 inches per minute.

The slope of the graph is -3 !!

11. Graph function  $F$ .



12. Write an equation giving  $F(t)$  in terms of  $t$ .

$F(t) = -3t + 60$

The slope is -3 (inches per minute).

The 'y-intercept' is 60.  $y = mx + b$

13. What is the domain of function  $F$ ?

$[ 0 , 20 ]$

14. What is the range of function  $F$ ?

$[ 0 , 60 ]$

15. Evaluate  $F(6)$ . What does  $F(6)$  represent in terms of the problem?

$F(6) = 42$  inches.  $F(6)$  represents the depth of the water in the tank after 6 minutes.

16. If  $F(t) = 45$ , then find the value of  $t$ . Describe what this value of  $t$  represents in terms of the problem.

$t = 5$  minutes. This value of  $t$  represents the time it takes for the water in the tank to be 45 inches deep.

**General Algebra II Worksheet #6 Unit 6 Selected Solutions Page 2**

A rectangular water tank is 8 feet long, 5 feet wide, and 4 feet deep. The tank is half full initially and water is pumped into the tank at 5 cubic feet per minute until the tank is full. Let  $t$  represent the time that water has been pumped into the tank (in minutes). Let  $f(t)$  represent the depth of the water in the tank (in inches). Answer each of the following. Show your process neatly organized.

17. How long will it take to fill the tank? 16 minutes

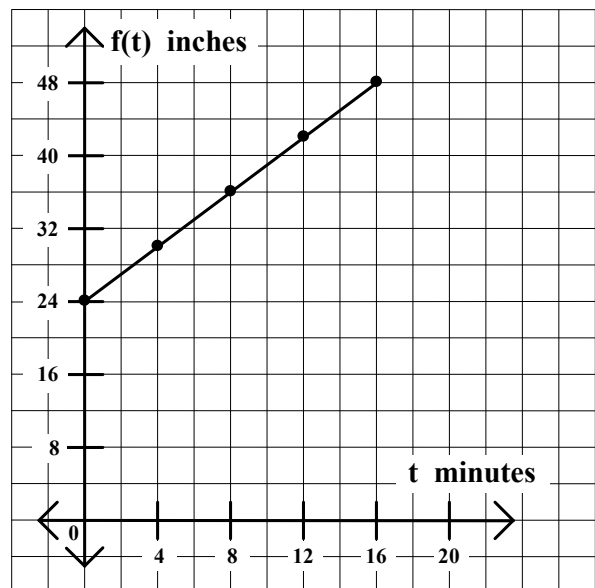
$V = LWH = (8 \text{ ft.})(5 \text{ ft.})(4 \text{ ft.}) = 160$  cubic feet. 80 cubic feet must be added to fill the tank.

Time =  $(80 \text{ cubic feet}) \div (5 \text{ cubic feet per minute}) = 16$  minutes

18. Make a table giving  $t$  and  $f(t)$  every 4 minutes from  $t = 0$  until the tank is full.

$t$	$f(t)$
0	24 ← half full tank
4	30
8	36
12	42
16	48 ← full tank

19. Graph function  $f$ .



The depth increases 24 inches in 16 minutes. It increases at 1.5 inches per minute.

The slope of the graph is +1.5 !!

20. Write an equation giving  $f(t)$  in terms of  $t$ .

The slope is 1.5 (inches per minute).

The 'y-intercept' is 24.  $y = mx + b$

$f(t) = 1.5t + 24$

21. What is the domain of function  $f$ ?

$[ 0 , 16 ]$

22. What is the range of function  $f$ ?

$[ 24 , 48 ]$

23. Evaluate  $f(10)$ . What does  $f(10)$  represent in terms of the problem?

$f(10) = 39$  inches.  $f(10)$  represents the depth of the water in the tank after 10 minutes.

24. If  $f(t) = 33$ , then find the value of  $t$ . Describe what this value of  $t$  represents in terms of the problem.

$t = 6$  minutes. This value of  $t$  represents the time it takes for the water in the tank to be 33 inches deep.