Name: Key Period:

# Video Streaming Task

You work for a video streaming company that has two monthly plans to choose from:

- Plan 1: A flat rate of $7 per month plus $2.50 per video viewed
- Plan 2: $4 per video viewed

1. What type of functions model this situation? Explain how you know.

Linear

Plan 1: x – incr. by 1 y – incr. by 2.50

Plan 2: x – incr. by 1 y – incr. by 4

2. Define variables that make sense in the context, and then write an equation with cost as a function of videos viewed, representing each monthly plan.

$x$ = # of videos

$f(x)$ = cost of videos

Plan 1: $f(x) = 2.5x + 7$

Plan 2: $f(x) = 4x$

3. How much would 3 videos in a month cost for each plan? 5 videos?

Plan 1: $f(3) = 2.5x + 7$

$= 2.5(3) + 7$

$= 7.5 + 7$

$f(3) = \$14.5$

$f(5) = 2.5(5) + 7$

$= 12.5 + 7$

$f(5) = \$19.5$

Plan 2: $f(3) = 4(3)$

$f(3) = \$12$

$f(5) = 4(5)$

$f(5) = \$20$

$\$14.5$ vs. $\$12$

$\$19.50$ vs. $\$20$

4. Compare the two plans and explain what advice you would give to a customer trying to decide which plan is best for them, based on their viewing habits.

If U watch more than 5 videos then choose plan 1;

If U watch less than 5 videos then choose plan 2.

NAME:

# FUNCTIONS
## CCSS 8.F.1

### Contaminated Drinking Water

A pond used for drinking water has been contaminated by a recent forest fire, and has to be drained. The pond contains approximately 29,600 gallons of water and will be drained at a rate of 925 gallons per hour.

1. How many gallons will remain in the pond after 5 hours of draining? After 10 hours? After 15 hours?

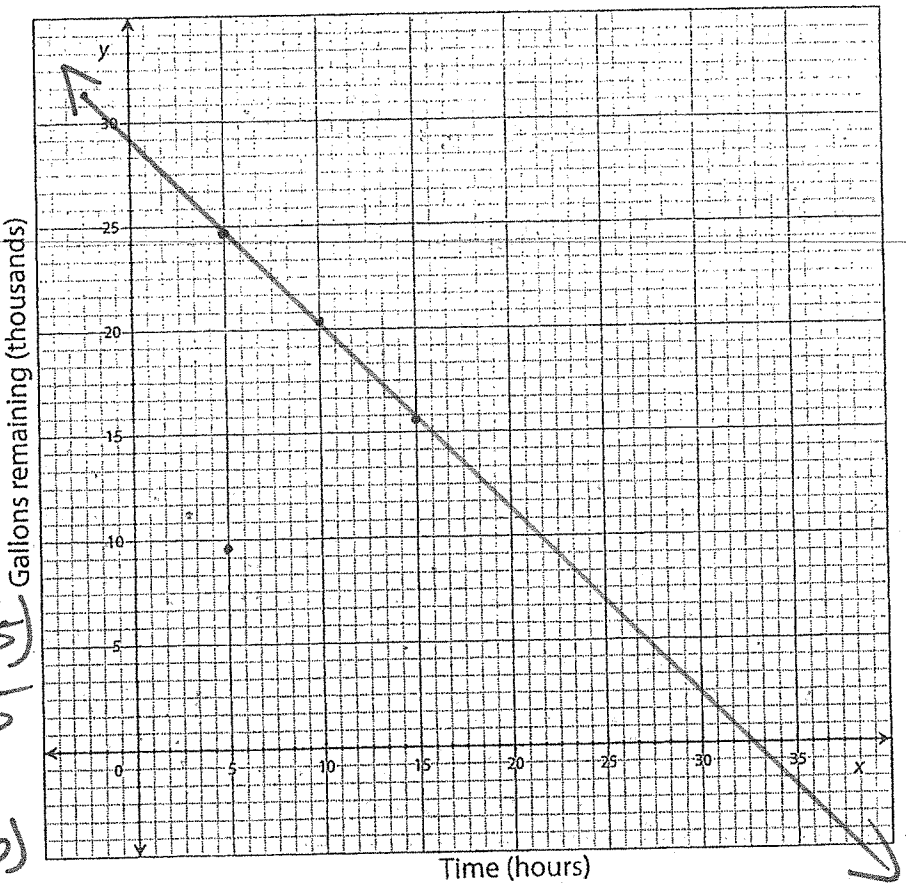
2. Graph each input and its corresponding output as a set of ordered pairs.

y = gallons ~~drain~~ remaining

x = time

$29600 - 925x = y$

| x | y |
|---|---|
| 5 | 24,975 |
| 10 | 20,350 |
| 15 | 15,725 |




$f(5) = 29600 - 925(5)$

$= 29600 - 4625$

$f(5) = 24975$

$f(10) = 29600 - 925(10)$

$= 29600 - 9250$

$f(10) = 20,350$

$f(15) = 29600 - 925(15)$

$= 29600 - 13875$

$f(15) = 15,725$

3. Does this situation represent a function? Explain your reasoning.

Yes, every input has exactly one unique output.

graph is straight line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# Battery Charging Task Notes

Sam wants to take his MP3 player and his video game player on a car trip. An hour before they plan to leave, he realized that he forgot to charge the batteries last night. At that point, he plugged in both devices so they can charge as long as possible before they leave.

- Sam knows that his MP3 player has 40% of its battery life left and that the battery charges by an additional 12 percentage points every 15 minutes.

| x: time | 0 | 15 | 30 | 45 | 60 |
|---|---|---|---|---|---|
| y: % | 40 | 52 | 64 | 76 | 88 |

+15 +15 +15 +12 +12 +12

$m = \frac{y}{x} = \frac{\text{rise}}{\text{run}} = \frac{12}{15} = \boxed{\frac{4}{5}}$

- His video game player is new, so Sam doesn't know how fast it is charging but he recorded the battery charge for the first 30 minutes after he plugged it in.

| time charging (minutes) | 0 | 10 | 20 | 30 |
|---|---|---|---|---|
| video game player battery charge (%) | 20 | 32 | 44 | 56 |

10 10 +12 +12

$m = \frac{12}{10} = \boxed{\frac{6}{5}}$

U-try:

1. If Sam's family leaves as planned, what percent of the battery will be charged for each of the two devices when they leave?

mp3: $y = \frac{4}{5}x + 40$

$y = \frac{4}{5}(60) + 40$

$y = 48 + 40 = \boxed{88\%}$

V.Game: $y = \frac{6}{5}x + 20$

$y = \frac{6}{5}(60) + 20$

$y = 72 + 20 = \boxed{92\%}$

x = minutes

y = %

U-try:

2. How much time would Sam need to charge the battery 100% on both devices?

mp3: $100 = \frac{4}{5}x + 40$

$-40 \quad -40$

$\frac{5}{4}(60) = \left(\frac{4}{5}x\right)\frac{5}{4}$

$\boxed{75 \text{ min} = x}$

V.game: $100 = \frac{6}{5}x + 20$

$-20 \quad -20$

$\frac{5}{6}(80) = \left(\frac{6}{5}x\right)\frac{5}{6}$

$\boxed{66.7_{\text{min}} = x}$

3. Write an equation for charging time for BOTH of Sam's devices. Let C = charging time and let t = percent charged in ONE minute.

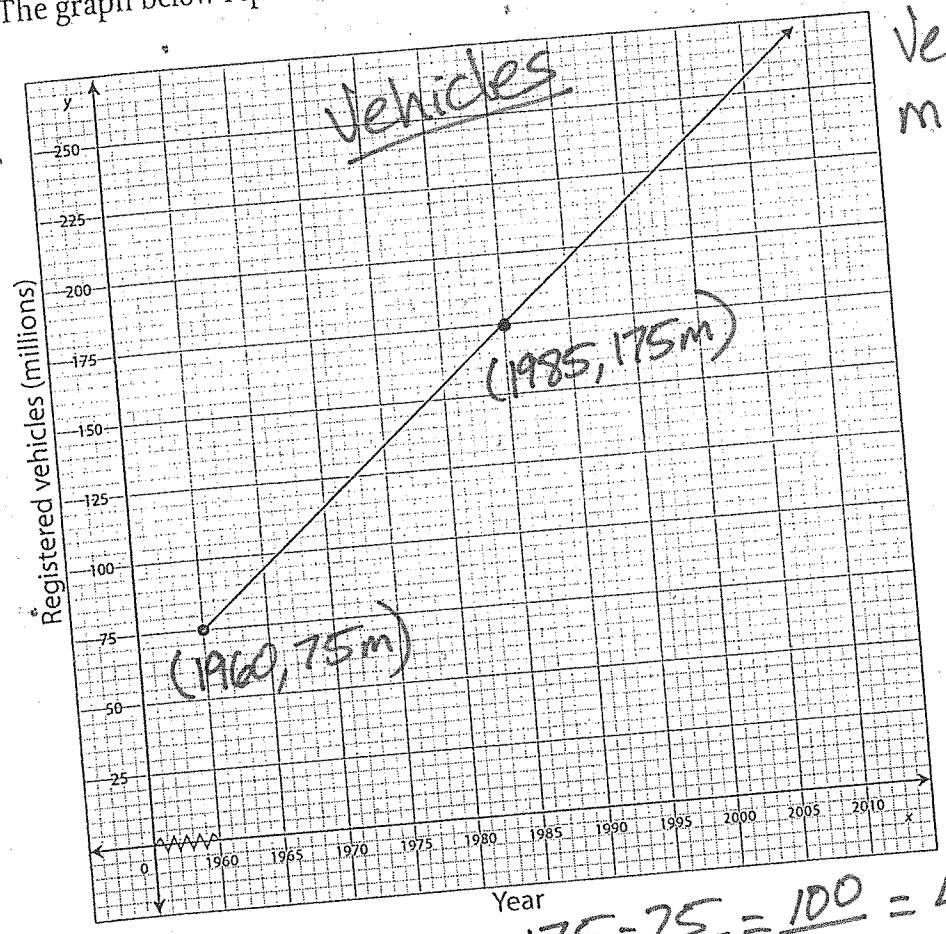
MP3 player: $y = \frac{4}{5}x + 40$ $t = \frac{4}{5}C + 40$

Video Game player: $y = \frac{6}{5}x + 20$ $t = \frac{6}{5}C + 20$

## Cars and Drivers

The U.S. Department of Transportation records the number of licensed drivers as well as the number of registered vehicles each year. Both sets of data can be modeled by linear functions. The function $y = 2.8x - 5401$ represents the number of licensed drivers in the United States between the years 1960 and 2010. The graph below represents the number of registered vehicles from 1960 to 2010.

Drivers:
$m = 2.8$




Vehicles:
$m = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x}$

1. Which model has a greater rate of change? $\frac{175-75}{1985-1960} = \frac{100}{25} = 4$ $y = 4x$

   4 vs. 2.8 Vehicles

2. According to the models, were there more licensed drivers or more registered vehicles in 1965?

   $\frac{4}{2.8} \approx 1.5$ times more

3. If the number of licensed drivers and registered vehicles were to continue to follow these models, would there be more licensed drivers or more registered vehicles in 2020? Explain your answer.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