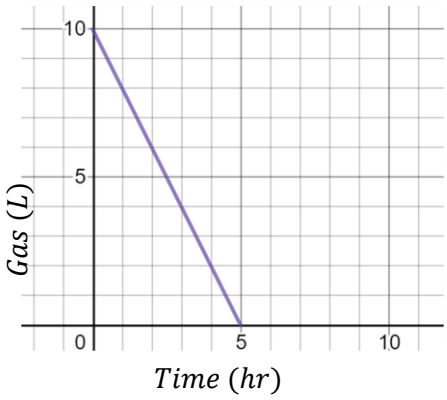
Section 2.5 – Practice Problems

1. Which slopes show an increase (circle them), a decrease (underline them), or no change (cross out)

$\frac{6}{5}$ $-\frac{1}{5}$ $\frac{0}{7}$ $\frac{9}{13}$ $-\frac{5}{4}$ $\frac{0}{5}$ $-\frac{2}{9}$ $\frac{3}{3}$

2. Graphs A, B, and C show the amount of fuel used in a car's tank over time. Describe what the rate of change represents, what could it mean about the vehicle?

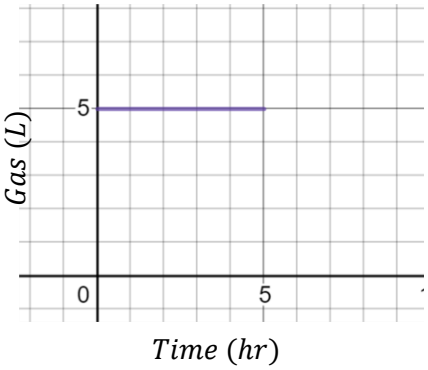


Represent:

L/hr L consumed per hour

Could Mean What about the Vehicle:

Not very fuel efficient

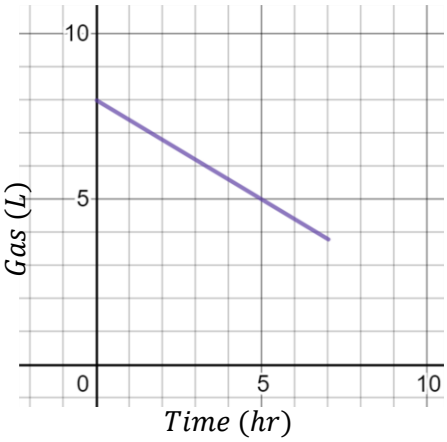


Represent:

L/hr gas consumption

Could Mean What about the Vehicle:

No consumption Electric Vehicle Perhaps



Represent:

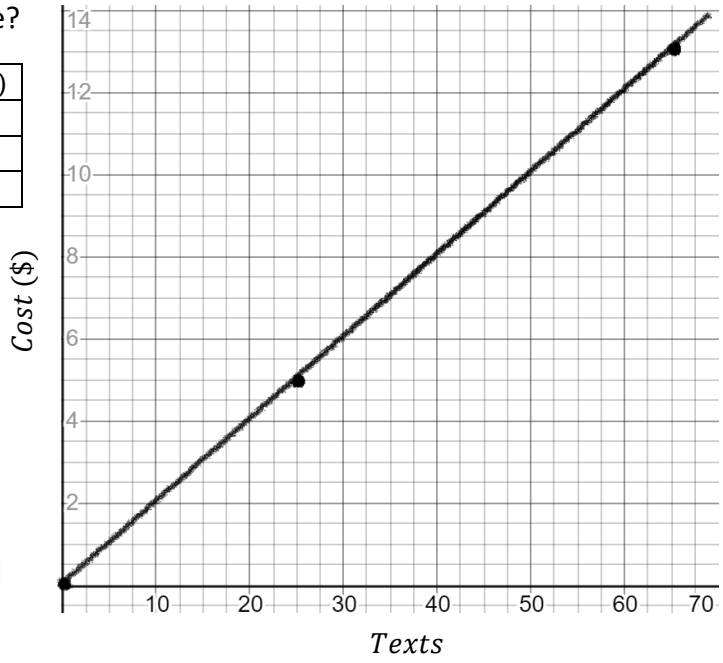
L/hr gas consumption

Could Mean What about the Vehicle:

More fuel efficient than the first one

3. Telus is taking advantage of me. They have me set-up on a plan where I pay per text message sent (See the grid). Graph the data (Think Dependant vs Independent variables), what is the rate of change of the line?

$Texts$	$Cost$ ($)
0	0
25	5
65	13



can use any two points

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{13 - 5}{65 - 25}$$

$$\frac{8}{40} = \frac{1}{5}$$

$\$0.20$/Text

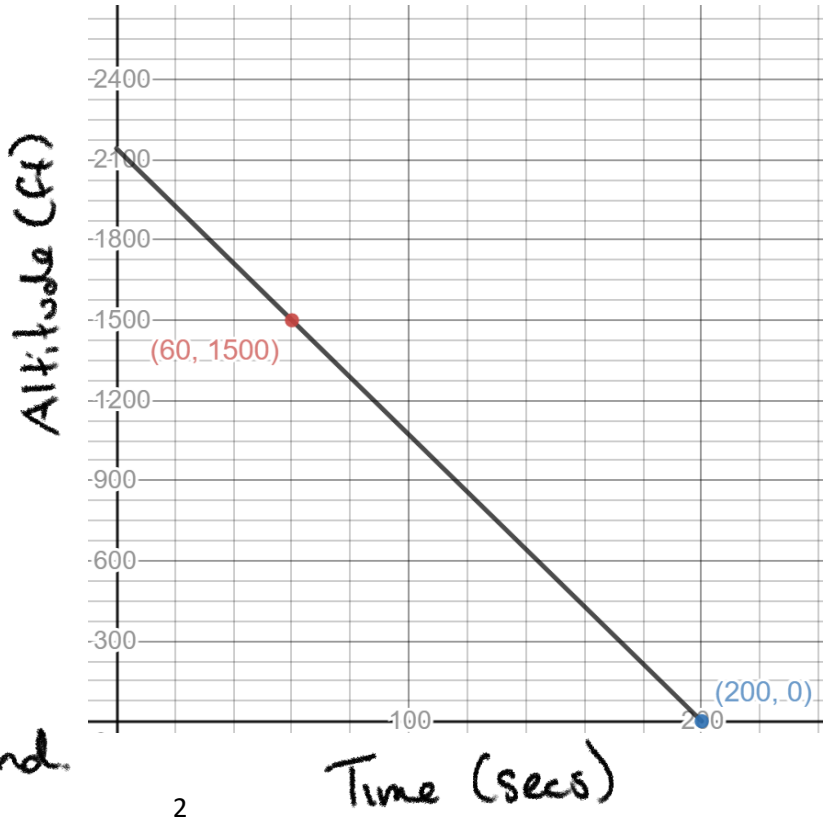
4. At what rate of change does the plane described in the graph descend at. Answer to the nearest tenth.

$$\frac{0 - 1500 \text{ ft}}{200 - 60 \text{ secs}}$$

$$\frac{-1500 \text{ ft}}{140 \text{ sec}}$$

$$-10.7 \text{ ft/sec}$$

Decreases 10.7 ft per second.



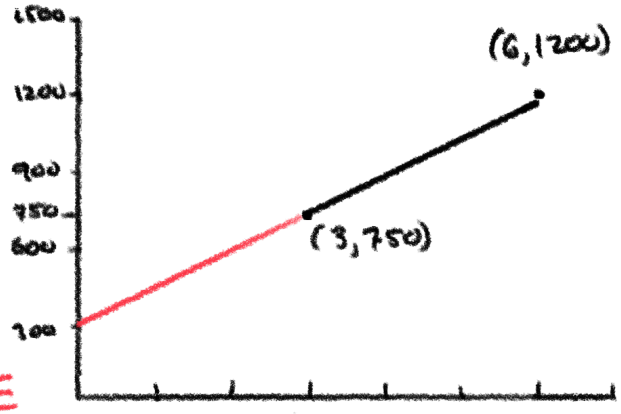
5. Mr. Phillips and his fiancé are wedding planning. They are looking to hire a DJ who charges $\$750\ for\ 3\ hours$ or $\$1200\ for\ 6\ hours$. Graph the info provided and draw a line connecting the two points.
   a) What is the slope of the line segment you have drawn? What does it represent?
   b) Extend the line to the $y-axis$, what is the DJ's flat rate?
   c) If they need the DJ for $5\ hours$, how much can they expect to pay?

a) $\frac{1200-750}{6-3} = \frac{\$450}{3hr} = \boxed{\$150/hr}$

Represents Price/hr

b) Flat rate is $300

c) $\$150/hr \cdot 5hr = 750$
$+ 300$ FLAT RATE
$\boxed{\$1050}$



6. Usain Bolt set a World Record for $100m$. He ran $100m\ in\ 9.58s$.
   a) How fast does he run in m/sec
   b) How fat does he run, if he can keep up the pace, in km/hr

$\frac{Distance}{Time}$

$\frac{100m}{9.58sec} = 10.4\ m/sec$

$\boxed{37.4\ km/hr}$

$\frac{10.4m}{1sec} \cdot \frac{1km}{1000m} \cdot \frac{60secs}{1min} \cdot \frac{60mins}{1hr} = \frac{10.4 \cdot 60 \cdot 60}{1000}\ km/hr$

7. Della is filling a pool for her kids. The graph shows the volume of water in the pool as she fills it.
   a) What is the rate of change of water in the pool (nearest hundredth)
   b) What is this rate of change in mL/min

See notes for picture of graph

Pick any two points

$$\frac{y_2-y_1}{x_2-x_1} = \frac{45-30}{60-40} = \frac{15}{20} = 0.75\,L/sec$$

$$\frac{0.75\,L}{1\,sec} \cdot \frac{1000\,mL}{1\,L} \cdot \frac{60\,secs}{1\,min} = \frac{0.75 \cdot 1000 \cdot 60}{1} = \boxed{\frac{45000\,mL}{min}}$$

8. The new roller coaster at the PNE has a top speed of $84 miles/hr$ What is the speed in km/hr.

$$\frac{84\,miles}{hr} \cdot \frac{5280\,ft}{1\,mile} \cdot \frac{0.305\,m}{1\,ft} \cdot \frac{1\,km}{1000\,m}$$

$$\boxed{135.3\,km/hr}$$

9. Gregor works for the city of Sidney. He drives a hot air lancer that blasts hot air at $3000 ft/sec$. How fast does the hot air move in $meters/sec$? (Round to the nearest tenth)

$$\frac{3000\,ft}{sec} \cdot \frac{0.305\,m}{1\,ft} = \boxed{915\,m/sec}$$

10. Mr. Philips was an up and coming baseball player, he could pitch at a top speed of $85 miles/hr$. How fast could he pitch in $feet/sec$. If the distance from the mound to the plate is $50 ft$ how long does the batter have to react and swing?

Distance 1st

$$\frac{85 \text{ miles}}{1 \text{ hr}} \cdot \frac{5280 \text{ ft}}{1 \text{ mile}} = \frac{448\,800 \text{ ft}}{\text{hr}}$$

Now time

$$\frac{448\,800 \text{ ft}}{1 \text{ hr}} \cdot \frac{1 \text{ hr}}{60 \text{ mins}} \cdot \frac{1 \text{ min}}{60 \text{ secs}} = \frac{448\,800}{3600}$$

$$\boxed{125 \text{ ft/sec}}$$

How long to travel 50 ft.

Is set up so feet cancel

Reverse this ratio

$$50 \text{ ft} \cdot \frac{1 \text{ sec}}{125 \text{ ft}} = \boxed{0.4 \text{ secs}}$$

$$125 \frac{\text{ft}}{\text{sec}} \leftrightarrow \frac{1 \text{ sec}}{125 \text{ ft}}$$

Batter has 0.4 seconds to react and swing.