System of Equations Word Problems (Graphs)

Darnell and Hector ride their bikes at constant speeds. Darnell leaves Hector's house to bike home. He can bike the 8 miles in 32 minutes. Five minutes after Darnell leaves, Hector realizes that Darnell left his phone. Hector rides to catch up. He can ride to Darnell's house in 24 minutes. Assuming they bike the same path, will Hector catch up to Darnell before he gets home?

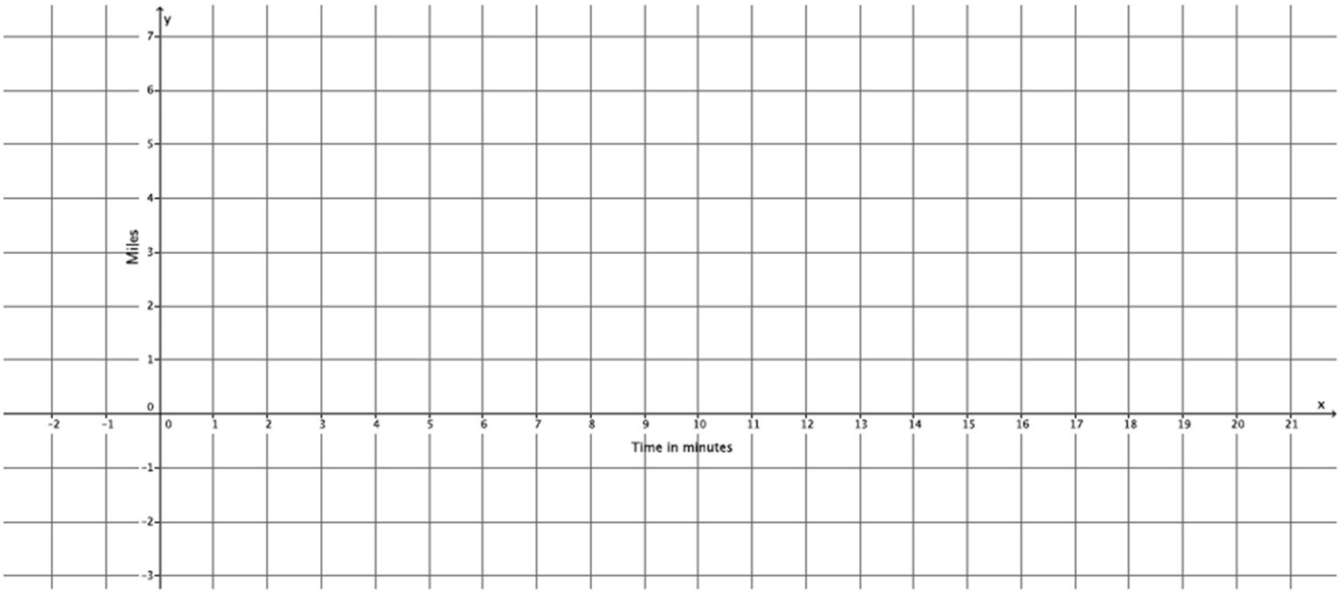
a) Write the linear equation that represents Darnell's constant speed.

b) Write the linear equation that represents Hector's constant speed. Make sure to take into account that Hector left after Darnell.

c) Write the system of linear equations that represents this situation.

System of Equations Word Problems (Graphs)

d) Sketch the graphs of the two equations.



e) Will Hector catch up to Darnell before he gets home? If so, approximately when?

f) At approximately what point do the graphs of the lines intersect?

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a) Write the linear equation that represents Darnell's constant speed.

Darnell's rate is $\frac{1}{4}$ miles per minute. If he bikes y miles in x minutes at that constant speed, then $y = \frac{1}{4}x$.

b) Write the linear equation that represents Hector's constant speed. Make sure to take into account that Hector left after Darnell.

Hector's rate is $\frac{1}{3}$ miles per minute. If he bikes y miles in x minutes, then $y = \frac{1}{3}x$. To account for the extra time Darnell has to bike, we write the equation

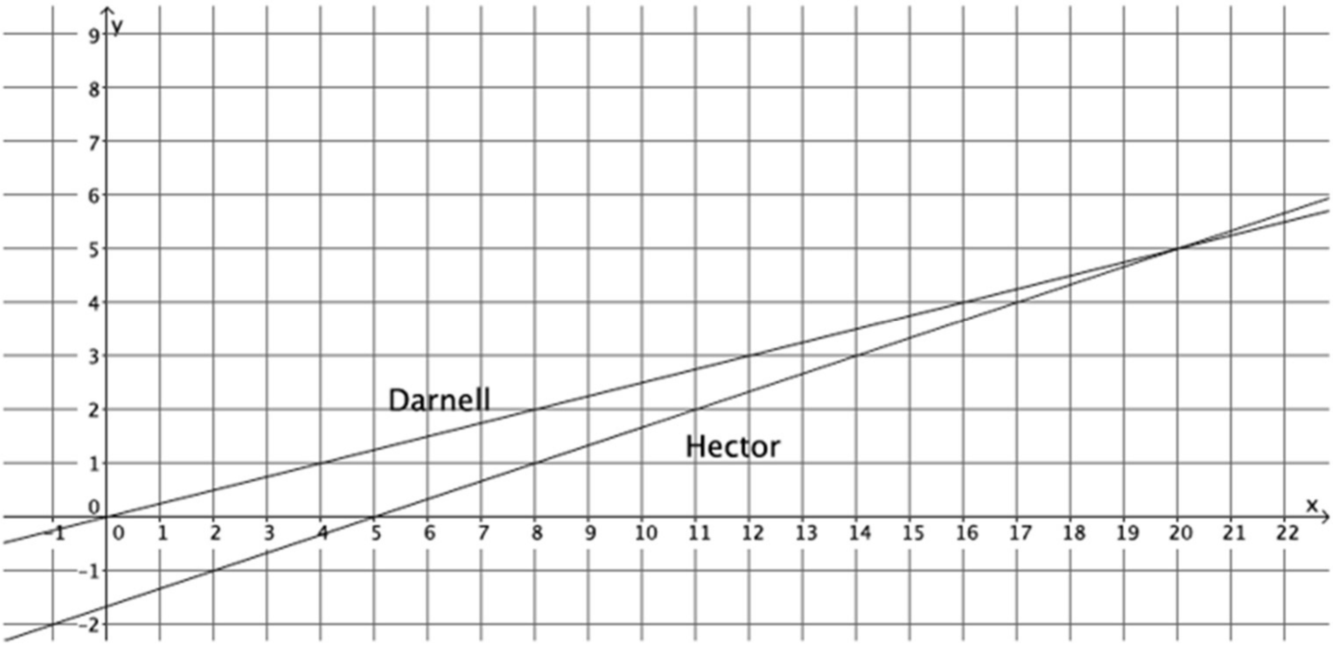
$$y = \frac{1}{3}(x-5)$$
$$y = \frac{1}{3}x - \frac{5}{3}.$$

c) Write the system of linear equations that represents this situation.

$$\begin{cases} y = \frac{1}{4}x \\ y = \frac{1}{3}x - \frac{5}{3} \end{cases}$$

System of Equations Word Problems (Graphs)

d) Sketch the graphs of the two equations.



e) Will Hector catch up to Darnell before he gets home? If so, approximately when?

Hector will catch up 20 *minutes after Darnell left his house (or* 15 *minutes of biking by Hector) or approximately* 5 *miles.*

f) At approximately what point do the graphs of the lines intersect?

The lines intersect at approximately $(20, 5)$.