

Cara's Candles

Name Key

Class Period _____

Cara likes candles. She also likes mathematics and was thinking about using algebra to answer a question that she had about two of her candles. Her taller candle is 16 centimeters tall. Each hour it burns makes the candle lose 2.5 centimeters in height. Her short candle is 12 centimeters tall and loses 1.5 centimeters in height for each hour that it burns.



Cara started filling out the following table to help determine whether these two candles would ever reach the same height at the same time if allowed to burn the same length of time. Finish the table for Cara. Use the data in the table to determine what time the two candles will be at the same height.

Time (hours)	16 cm candle height (cm)	12 cm candle height (cm)
0	16	12
1	13.5	10.5
2	11	9
3	8.5	7.5
4	6	6
5	3.5	4.5
6	1	3
7	-1.5	1.5

1. At what time will the two candles be the same height?

4 hours

2. What are the heights of the candles at this time?

6 cm

3. Justify your solution algebraically by:
 - a. Write a formula for each candle relating the height to the burn time

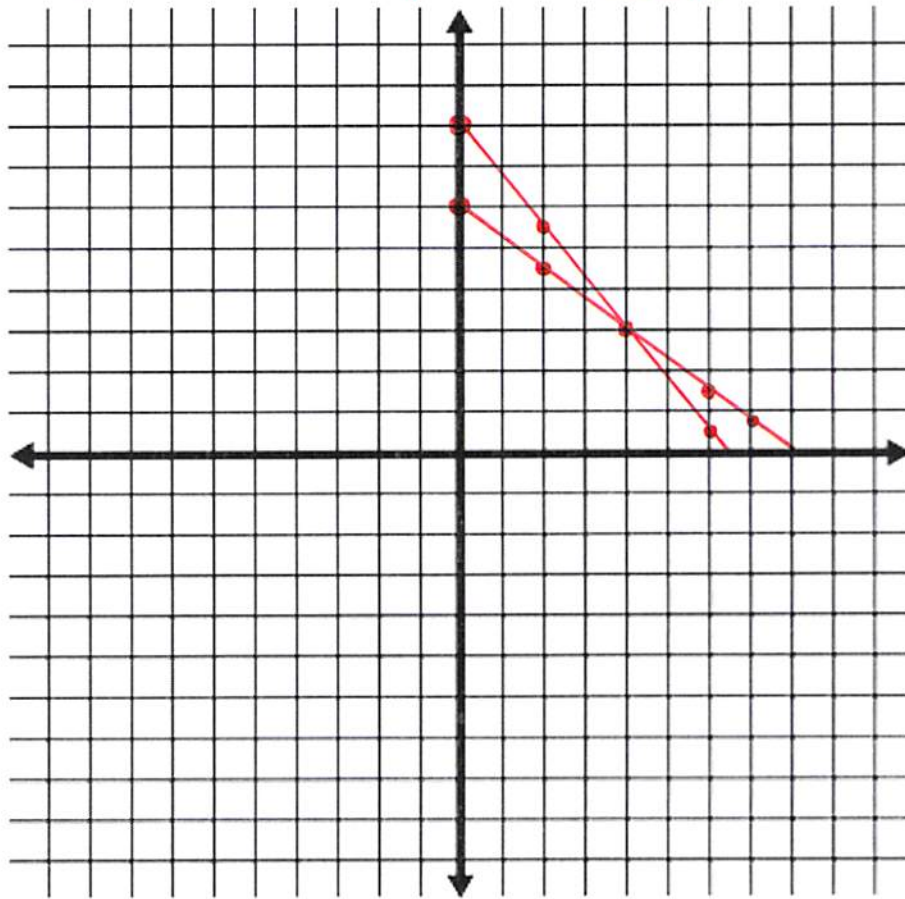
b. Show that at the time stated above the candles will be the same height.

4. Do all of the heights in your table make sense? Why or why not?

NO, you cannot have a negative height.

5. Create a graph showing the relationship between the heights of the two candles.

Where can you find the solution on the graph? where the graphs intersect at the point (4, 6).



6. What do the y-intercepts on this graph represent?

The heights of the candles before they were burned.

a)

$X = \text{hours}$

$T = \text{tall candle}$

$S = \text{short candle}$

$$T = 16 - 2.5X$$

$$S = 12 - 1.5X$$

b) $16 - 2.5X = 12 - 1.5X$

$$\begin{array}{r} +1.5X \qquad \qquad +1.5X \\ \hline \end{array}$$

$$\begin{array}{r} 16 - X = 12 \\ -16 \qquad -16 \\ \hline \end{array}$$

$$\begin{array}{r} -X = -4 \\ \hline -1 \qquad -1 \end{array}$$

$$X = 4$$

4 hours