High School / Unscored Student Samples ITEM #4

MATH ANNOTATIONS * SMARTER BALANCED PERFORMANCE TASK

Focus Standards and Claim

Claim 2

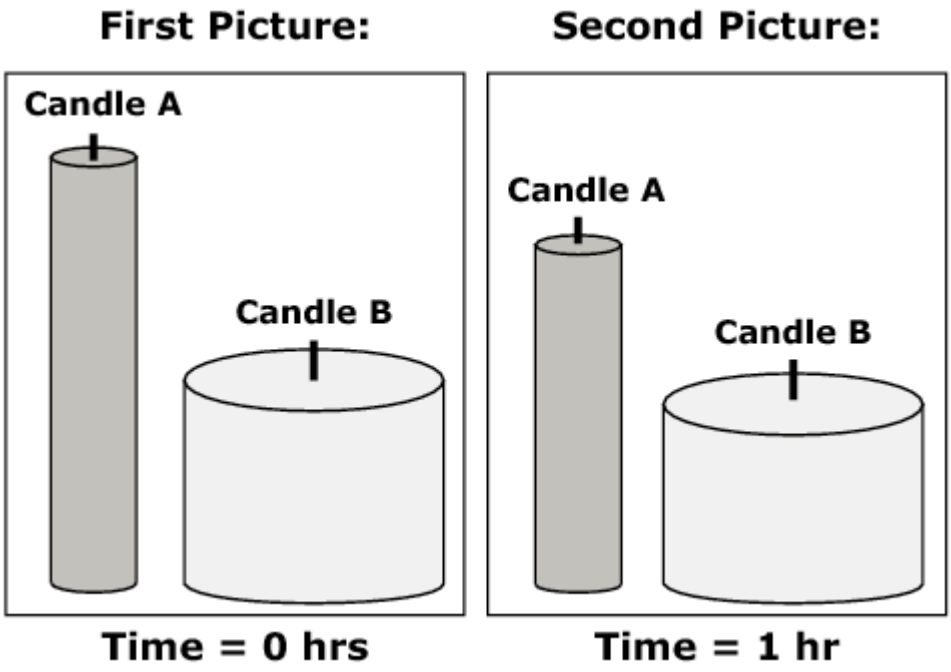
FLE.B.5

Stimulus

Lights, Candles, Action!

Your friend Abbie is making a movie. She is filming a fancy dinner scene and she has two types of candles on the table. She wants to determine how long the candles will last.

She takes a picture, lights the candles, and then lets them burn for 1 hour. She then takes a second picture. You can assume that each candle burns at its own constant rate.



Candle Type A initial height = 20 cm

Candle Type B initial height = 10 cm

Candle Type A height after burning for 1 hour = 16 cm

Candle Type B height after burning for 1 hour = 9 cm

You will use this information to help Abbie think about the candles she might use for her film.

Item Prompt

You have decided to use functions to help Abbie think about the candles.

You show her how to represent the height of a candle, ***h***, as a function of time, ***t***, using this equation:

$$h = k + nt$$

First, explain to Abbie what **k** and **n** represent in order to model the different candles. Be specific in your explanation.

Sample Responses

Sample Response A

k = is how much the candle burns in one hour

y = -1x + 10

(burns 1 cm in an hour)

y = -4x + 20

(burns 4cm in an hour)

n = the height of the candle originally

Sample Response B

k = initial height

n = number of cm dropped

20 = 20 + 0(0)

20 = 20

Sample Response C	For candle A: k = 20, original height of candle n = -4, rate at it burns/hr For candle B: k = 10, original height of candle n = -1, rate at it burns/hr k = original height of candle n = rate at which candle burns cm/hr
Sample Response D	k = initial height n = constant rate of the candle burning Candle A: h = 20 = (4)t Candle B: h = 10 – (1)t
Sample Response E	k represents the height after burning the candle for a specific amount of time. n represents the height of how much is burned off during the time for example: k = 16 cm n = 4cm h = k+nt h = 16 + 4(1) = h = 16 + 4 h = 20cm
Sample Response F	The “h” is the height of the candle, as the function of time is “t.” The letter “k” symbolizes to be the subtraction of both candles in every hour. And “n” is the missing value that needs to solve.
Sample Response G	k is the starting height, while n is the rate at which the height is decreasing.

Sample Response H	h = height t = time n will be the amount of hours k will be the height of the candle from the beginning
Sample Response I	Candle A = 20 – 4cm (t) Initial amount = 20 = k Amount decreases by hour = 4cm = n Candle B = 10 – 1cm Initial amount = 10 = k Amount decreases by hour = 1 cm = n
Sample Response J	k is the original height of Candle Type A and Candle Type B before they began to burn. n is negative. It's the difference of height after candle Type A & Candle Type B's 1 hour of burning.
Sample Response K	k is the rate of change and n is 2n-1 = 8 2n = 9 n=9/2 8= -1 + 2(9/2)