

Help with Functions

In this homework, you will be solving functions and helping to teach Cobi, a life-like robot, about the following math problems.

Problem 1

Instruction: For this problem, write how you would explain to Cobi how to solve the problem.

In preparing for camping, Cobi's friends Tasha and Zach have been arguing over who is better at making s'mores. Tasha has suggested that they use math to figure out who is fastest. Tasha already has a function for how quickly she can make s'mores. It is given below. Help Cobi make a function for Zach given that we know how many minutes it takes him to make 9 s'mores and it takes 1 minute for him to set up.

Step	S'more Maker	Minutes (y)	S'mores (x)	Set-up (b)	Slope (m)
0	Tasha	8	2	4	2
1	Zach	9	2	1	???

Solution

Step	S'more Maker	Minutes (y)	S'mores (x)	Set-up (b)	Slope (m)
0	Tasha	8	2	4	2
1	Zach	9	2	1	4

$$y = mx + b$$

Tasha's equation: $y = 2x + 4$

For Zach's equation...

$$y \text{ minutes} = m \times (x \text{ s'mores}) + 1 \text{ minute for}$$

$$9 \text{ minutes} = m \times (2 \text{ s'mores}) + 1 \text{ minute}$$

$$9 - 1 = m \times 2$$

$$\frac{8}{2} = \frac{m \times 2}{2}$$

$$4 = m$$

$$m = 4 \text{ minutes per s'more}$$

So the equation for Zach's time is $T=4s + 1$, when **T** stands for the amount of time, in minutes, it takes for them to make all the s'mores, and **s** stands for the amount of s'mores they are making.

Explanation

Write your explanation here. Remember to use the Talk Moves in order to give a good explanation that might help Cobi learn how to solve the problem.

Problem 2

Instruction: For this problem, Cobi wants to use the equation to figure out how long it takes Tasha and Zach to make 10 s'mores each. Help Cobi fill in how long it takes Tasha to make different amounts of s'mores.

Step	S'more Maker	Amount of S'mores (s)	Time (T)
0	Tasha	$s = 0$	4
1	Tasha	$s = 10$???

Solution

Step 1

Step	S'more Maker	Amount of S'mores (s)	Time (T)
0	Tasha	$s = 0$	4
1	Tasha	$s = 10$	24

Using Tasha's equation of: $T = 2s + 4$

$$\text{Step Zero: } T = 2(0) + 4$$

Step One...

$$s = 10$$

$$T = 2(s) + 4$$

$$T = 2(10) + 4$$

$$T = 20 + 4$$

$$T = 24$$

It takes Tasha 24 minutes to make ten s'mores.

Problem 3

Instruction: For this problem, Cobi wants to compare how quickly Tasha and Zach can make s'mores. Help Cobi figure out how long it takes Zach to make 10 s'mores using Zach's equation.

Step	S'more Maker	Amount of S'mores (s)	Time (T)
0	Zach	$s = 0$	1
1	Zach	$s = 10$???

Solution

Step 1

Step	S'more Maker	Amount of S'mores (s)	Time (T)
0	Zach	$s = 0$	1
1	Zach	$s = 10$	41

Using Zach's equation of: $T = 4s + 1$.

$$\text{Step Zero: } T = 4(0) + 1$$

Step One...

$$s = 10$$

$$T = 4(s) + 1$$

$$T = 4(10) + 1$$

$$T = 40 + 1$$

$$T = 41$$

It takes Zach 41 minutes to make ten s'mores.

While Zach is faster at setting the s'more station up, Tasha can actually make more s'mores faster when the amount of s'mores made increases.

Part 4

Instruction: For this problem, write how you would explain to Cobi how to solve the problem.

When Cobi gets older, he wants to work as a camp counselor like his older brother and sister, Benji and Daisy! Benji and Daisy worked at different camps and, therefore, made different salaries. Over dinner one night, Cobi wanted to see which camp, Benji's or Daisy's, pays best. All the information Benji and Daisy could remember is listed below. Help Cobi make a function for Daisy's summer pay as a camp counselor using the information given.

Step	Counselor	Money Earned (y)	Weeks (x)	Summer Bonus (b)	Weekly Pay (m)
0	Benji	\$500	7	\$115	\$55
1	Daisy	\$700	12	???	\$40

Solution

Step	Counselor	Money Earned (y)	Weeks (x)	Summer Bonus (b)	Weekly Pay (m)
0	Benji	\$500	7	\$115	\$55
1	Daisy	\$700	12	\$220	\$40

$$y = mx + b$$

Benji's equation: $y = 55x + 115$

For Daisy's equation....

y dollars = (m dollars per week) \times (x weeks) +

700 dollars = (40 dollars per week) \times (12 week

$$700 = 480 + b$$

$$220 = b$$

$$b = \$220 \text{ summer bonus}$$

So the equation for Daisy's summer pay is $P = 40w + 220$, where P stands for the amount earned in a summer, in dollars, and w stands for the number of weeks worked.

Explanation

Write your explanation here. Remember to use the Talk Moves in order to give a good explanation that might help Cobi learn how to solve the problem.

Part 5

Instruction: Now that we figured out Daisy's summer bonus, Cobi wants to use the equations to see at whose camp he would make the most money if he worked the whole summer, or 15 weeks. Use the equation to help Cobi figure out how much he would make at Daisy's camp in 15 weeks.

Step	Camp Counselor	Weeks Worked (w)	Pay (P)
0	Daisy	w = 0	\$220
1	Daisy	w = 15	???

Solution

Step 1

Step	Camp Counselor	Weeks Worked (w)	Pay (P)
0	Daisy	w = 0	\$220
1	Daisy	w = 15	\$820

Using Daisy's equation from Part 4 of: $P = 40w + 220$

$$\text{Step Zero: } T = 40(0) + 220$$

Step One...

$$w = 15$$

$$P = 40(w) + 220$$

$$P = 40(15) + 220$$

$$P = 600 + 220$$

$$P = \$820$$

Cobi would earn \$820 for working 15 weeks at Daisy's camp.

Part 6

Instruction: For comparison, Cobi now wants to find how much money he would earn if he instead worked at Benji's summer camp. Help Cobi figure out how much he would make.

Step	Camp Counselor	Weeks Worked (w)	Pay (P)
0	Benji	w = 0	\$115
1	Benji	w = 15	???

Solution

Step 1

Step	Camp Counselor	Weeks Worked (w)	Pay (P)
0	Benji	w = 0	\$115
1	Benji	w = 15	\$940

Using Benji's equation from of: $P = 55w + 115$

$$\text{Step Zero: } T = 55(0) + 115$$

Step One...

$$w = 15$$

$$P = 55(w) + 115$$

$$P = 55(15) + 115$$

$$P = 825 + 115$$

$$P = \$940$$

Cobi would earn \$940 for working 15 weeks at Benji's camp. Therefore, even though Daisy's camp has a larger summer bonus, Benji's high weekly pay allows him to make more money the more weeks he works. So, Cobi should work at Benji's camp if he wants to make more money for a summer.