

Name _____ Date _____

CHAPTER 6 – POST-TEST WRITE ABOUT

Explain how to solve the problem, be specific in describing your steps and reasons for using that strategy (Why are you doing that step? What will it tell you?) Solve the problem and be sure to include appropriate units.

You are considering joining a gym, but are torn about which one to go with. Ballys fitness charges a one-time membership fee of \$100 with a monthly charge of \$40. Club Julian charges a one-time membership fee of \$150 with a monthly charge of \$35. Set up a system to find out at what point in time the two clubs will be equal in price. Which would be the better deal if you were planning on staying for a year (12 months)? You may use any method to solve.

$$\begin{array}{l} \text{Ballys} \\ \text{Club Julian} \end{array} \left\{ \begin{array}{l} Y = 40x + 100 \\ Y = 35x + 150 \end{array} \right.$$

$$35x + 150 = 40x + 100$$

$$35x \qquad \qquad -35x$$

$$150 = 5x + 100$$

$$100 \qquad \qquad 100$$

$$\begin{array}{r} 50 = 5x \\ \hline 5 \qquad \qquad 5 \\ \hline 10 = x \end{array}$$

$$Y = 40(10) + 100$$

$$400 + 100$$

$$Y = 500$$

Club
Julian

$$Y = 40(12) + 100$$

$$480 + 100$$

Ballys
Y = 580

$$\begin{array}{l} Y = 35(12) + 150 \\ \qquad \qquad \qquad 420 + 150 \\ \hline Y = 570 \end{array}$$

To find which gym offers a better deal I first set up a system. I decide y equals the total cost of membership + x equals the months. For Ballys Fitness I have the total price equal the monthly charge of \$40 (40x) + the fee of \$100. Now for Club Julian I have the total cost equal the monthly charge of \$35 (35x) plus the fee of \$150. To solve the system I just created, I used the substitution method. First, I substituted Club Julian's total cost in to equal Ballys' total cost. Next, I solved the equation till I isolated x + got 10. This tells me that the two clubs will be equal in price after 10 months. Now to find which will be a better deal in 12 months I simply substitute 12 in for x. I do this in both equations for each membership. Once I finished solving I see that Club Julian is a little bit cheaper than Ballys if you plan on staying for 12 months.

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Bally's

$$y = 40x + 100$$

x = months

y = charge

Julian

$$y = 35x + 150$$

$$\begin{cases} y = 40x + 100 \\ y = 35x + 150 \end{cases}$$

$$\begin{cases} 40x + 100 \\ 35x + 150 \end{cases}$$

$$40x + 100 = 35x + 150$$

$$-35x \quad -35x$$

$$y = 40(10) + 100$$

$$y = 400 + 100$$

$$y = 500$$

$$5x + 100 = 150$$

$$-100 \quad -100$$

$$\frac{5x}{5} = \frac{50}{5}$$

$$x = 10$$

Both clubs will charge you after 10 months

Bally's

$$y = 40(12) + 100$$

$$y = 480 + 100$$

$$y = \$580$$

Julian

$$y = 35(12) + 150$$

$$y = 420 + 150$$

$$y = \$570$$

Club Julian is cheaper after 1 year (12 months).

To solve the problem, you must set up a linear system. In this case, x is the months and y is the total charge. Once you have both functions, put them into a system.

Then, you solve the system. Since there are two isolates y variables, you should use substitution. So, you circle what y equals and you drag it in the second function. Once the equation is set up, you solve. So, you get an answer of x=10. This means that in 10 months the price of both clubs would be equal. To find they do the charge at 10 months, you take your x value, 10, and place it into the first function. Then you get y=500. This means that after 10 months, both clubs will charge \$500.

If you were to stay 12 months, would it be cheaper? To solve, you simply place 12 month in for x in both functions and solve. Once you simplify, the results show that Club Julian is \$10 cheaper than Bally's and is the better deal at 12 months.

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Work

$$y = \text{tot. cost} \quad x = \text{months}$$

$$\begin{cases} y = 40x + 100 \\ y = 35x + 150 \end{cases}$$

$$\frac{35x + 150 = 40x + 100}{-5x = -50}$$

$$\begin{aligned} 35x + 50 &= 40x \\ -35x &= -50 \\ 5x &= 50 \\ 10 &= x \end{aligned}$$

$$y = 40(10) + 100$$

$$y = 400 + 100$$

$$y = 500 \quad 10 \text{ months, } \$500$$

$$y = 40(12) + 100$$

$$480 + 100 = \$580$$

$$\$580 > \$570$$

$$y = 35(12) + 150$$

$$420 + 150 = \$570$$

After 10 months, Club Julian will be cheaper to join

Explanation

First, I set up my systems. They would each be in standard $y = mx + b$ form, where y be the total cost, x the ~~fees~~ month, x be the months, and b be the starting cost. In joining, I plugged in values for the variables for each gym. For Ballys, I set up $y = 40x + 100$, where 40 is the ~~fees~~ month and 100 is the starting cost. Then, I did the same steps for Club Julian, where I got $y = 35x + 150$, where 35 is the ~~fees~~ month, and 150 is the starting cost.

Next, I put the equations in a system and, using the substitution method, solved. I found that after 10 months each gym fee would cost \$500.

To find that gym would be cheaper after one year, I put my equations in a system. For x , I plugged in 12 for 12 months. Then, I solved for y . I found that after 12 mo., Ballys costs \$580, and Julian costs \$570. $\$580 > \570 , so Club Julian would be cheaper to join.

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$$\begin{cases} x = 100 + 40y \\ x = 150 + 35y \end{cases}$$

$$100 + 40y = 150 + 35y$$

$$\begin{array}{rcl} & -35y & \\ 100 + 5y & - & 150 \\ \hline & -100 & \end{array}$$

$$\frac{5y}{5} = \frac{-50}{5}$$

$$y = 10 \text{ months}$$

$$100 + 400 = \$500$$

$$\begin{cases} x = 100 + 40(12) \\ x = 150 + 35(12) \end{cases}$$

$$160 + 480 = \$570$$

$$100 + 480 = \$580$$

10 months until same price

Club Julian is better at 12 months

First, I setup my system to show the costs of each gym.

Then, I solve my system using Substitution to find that at 10 months both gyms will be \$500.

Next, I plug 12 month into my equation at the y variable which I used to show time. I found the Bally fitness would be \$10 more than club Julian at 12 months.

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$$\begin{aligned} Y &= \text{Cost} \\ x &= \text{months} \end{aligned}$$

$$\left\{ \begin{array}{l} y = 40x + 100 \\ y = 35x + 150 \end{array} \right.$$

$\frac{35}{40}$

$$40x + 100 = 35x + 150$$

$$400 + 100 = 420 + 150$$

$$580 \neq 570$$

$$40x = 35x + 50$$

$$400 + 100 = 350 + 150$$

$$\frac{5x}{5} = \frac{50}{5}$$

$$x = 10$$

Equal in price
at 10 months (\$500);
At 12 months, Club
Julian is better
(\$570 compared to Ballys,
\$580)

First, I set up a system
of linear functions
in slope-intercept form.
Next, I substituted the first
equation for y in the
second equation and solved,
to determine the number of mon-
th which costs are equal.
I then repeated, but substituted
12 for x and took a look
at what the costs would be at one
year. I discovered Julian
is better at one year.

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$$y = 100 + 40x$$

$$y = 150 + 35x$$

$$100 + 40x = 150 + 35x$$

$$100 + 5x = 150$$

$$\frac{100}{-100} \quad \frac{100}{-100}$$

$$\frac{5x}{5} = \frac{50}{5}$$

$$x = 10$$

$$y = 100 + 40(10)$$

$$y = 100 + 400$$

$$y = 500$$

$$x = 10 + 2$$

$$x = 12$$

Clubs are the same
at 10 months

$$y = 100 + 40(12)$$

$$y = 100 + 480$$

$$y = 580$$

$$y = 150 + 35(12)$$

$$y = 150 + 420$$

For 12 months,
Julian is better

first, you make an equation like
 $y = 100 + 40x$. y represent the total
 price & x represent the month.
 The question ask for 12 months.
 just add 2 to become 12. You
 take y and put it to the
 second y to find x . After
 get x , use x to find y .
 Put x on one equation.
 after get all the answer.
 add 2 to x and find which
 one is better price.

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$y = \text{total cost}$ $x = \text{months}$

$$\text{Ballys: } y = 40x + 100$$

$$\text{Club Julian: } y = 35x + 150$$

$$\begin{array}{r} \text{Ballys} \\ \hline y = 40(12) + 100 \end{array}$$

$$\underline{y = 480 + 100}$$

$$\cancel{\text{--- wants } y = 1080}$$

Club Julian

$$y = 35(12) + 150$$

$$\underline{y = 420 + 150}$$

$$\boxed{y = 570}$$

In order to find the better deal after 12 months, I need to form a system then input 12 for month to see which total is less.

I knew that the slope of the system will most always be a rate and the y -intercept will be the starting point (membership). After forming a system, I plug in 12 for x in the Ballys system where y is the total cost. I did the same for Club Julian, and found that the total cost (y) of Club Julian is less than $\frac{1}{2}$ of Bally's total cost. So it is the better deal!

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what do you
equation mean

$$1) \quad y = 100 + 40x$$

$$+ y = 150 + 35x$$

$$-1 \quad 100 + 40x = 150 + 35x$$

$$\cancel{100} \quad \cancel{-100}$$

$$40x = 50 + 35x$$

$$\cancel{-35x}$$

$$\cancel{-35x}$$

$$\frac{5x}{5} = \frac{50}{5}$$

$$x = 10$$

$$y = 100 + 40(3.3)$$

$$y = 100 + 132$$

$$y = 232$$

$$2) 100 + 40x \cdot 12$$

$$100 + 480 = 580$$

OR

$$150 + 35x \cdot 12$$

$$150 + 420 = 570$$

I got this by putting the -1 numbers into a inequality.

Then I just added the x value + the regular numbers together.

$$(3.3, 232)$$

It would be better to go with Club Julian because of the lower cost in the 12 month time period.

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$y = 40x + 100$ $y = 35x + 150$	$\begin{array}{l} \text{monthly charge} \\ \\ \text{one-time fee} \end{array}$ $\begin{array}{l} \text{monthly charge} \\ \\ \text{one-time fee} \end{array}$	$y = 40(12) + 100$ $y = 35(12) + 150$	\$580 \$435
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First to solve this problem I needed to write two equations. My first equation for Bally's Fitness is $y = 40x + 100$. This gives the monthly charge plus the original fee. My second equation for Club Julian is set up the same format as the others ($y = 35x + 150$). After substituting 12 for x, I can conclude that after 12 months, Club Julian will be the better deal. Club Julian will be \$435 while Bally's would be \$580.

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WORK

$$x = 100 + 40m$$

$$x = 150 + 35m$$

Ballys Fitness

$$\begin{array}{r} 100 + 40m \\ - 35m \\ \hline 100 + 5m \end{array} = \begin{array}{r} 150 + 35m \\ - 35m \\ \hline 150 + 35m \end{array}$$

$$\begin{array}{r} 100 \\ - 100 \\ \hline 0 \end{array} + \begin{array}{r} 5m \\ - 100 \\ \hline 5m \end{array} = \begin{array}{r} 150 \\ - 150 \\ \hline 0 \end{array} + \begin{array}{r} 35m \\ - 35m \\ \hline 35m \end{array}$$

$$\begin{array}{r} 5m \\ \hline 5 \\ \hline m = 10 \end{array}$$

Explanation

First, I had to set each of them up as an equation. Then I need to solve for the number of months. I then plug that in and solve for the time.

$$100 + 40(10) = 150 + 35m$$

$$100 + 400 = 150 + 35m$$

$$\begin{array}{r} 400 \\ - 150 \\ \hline 250 \end{array} = 150 + 35m$$

$$\begin{array}{r} 250 \\ - 35 \\ \hline 35 \end{array} = 35m$$

$$7.1 = m$$

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$$\begin{array}{ll}
 \text{Bally's} & y = 100 + 40x \\
 & x = 12 \\
 \text{Club Julian} & y = 150 + 35x \\
 \text{bally's} & y = 100 + 40(12) \\
 & y = 100 + 480 \\
 & y = \$580 \\
 \text{Club Julian} & y = 150 + 35(12) \\
 & = 150 + 420 \\
 & y = \$570 \checkmark \\
 & \text{better deal}
 \end{array}$$

To find out which gym would be a better deal if I was staying for 12 months, I first had to set up a system. The first equation in my system is the total equaling the one-fee plus the monthly charge. The second equation is the same, but it is for Club Julian instead of Bally's Fitness. After I found the system, I substituted the number of months in for the monthly charge. Then, I solved both equations. After solving, I found that Club Julian is \$10 less than Bally's, thus making it the better deal.