Name ___Key___   Date _____

End of Module 2 Study Guide   No calculators on #1 or #5.

1. The water level in Ricky Lake changes at an average of $-\frac{7}{16}$ inch every 3 years.

   a. Based on the rate above, how much will the water level change after one year? Show your calculations and model your answer on the vertical number line, using 0 as the original water level.

Year 1	Year 2	Year 3
?	?	?
-7/16 in		

$$-\frac{7}{16} \div 3 = \frac{-7}{16} \cdot \frac{1}{3} = \boxed{\frac{-7}{48} \text{ in}}$$

```
       0.145
  48 ) 7.000
      -48
       220
      -192
       280
      -240
        40
```

Number line:
```
0 -------------- Original Water Level
                 (in inches)
-0.1
          -0.15
-0.2
```

Hint: After you find the change in one year, convert that number to a decimal and plot on the number line provided.

   b. How much would the water level change over a 7-year period?

$$-\frac{7}{48} \cdot \frac{7}{1} = \frac{-49}{48} = \boxed{-1\frac{1}{48} \text{ in}}$$

The water level changes ___$-1\frac{1}{48}$___ inches over a 7-year period. (Express answer as a fraction and don't forget your sign!)

   c. When written in decimal form, is your answer to part (b) a repeating decimal or a terminating decimal? Justify your answer using long division.

```
          1.020833
  48 ) 49.0000000   7 400
      -48            -384
       10             160
      - 0            -144
       100            160
      - 96
        40
      -  0
       400
```

My answer is a (circle one) terminating / (repeating) decimal because...

___the 3 repeats___

2. Kay's mother taught her how to make handmade ornaments to sell at a craft fair. Kay rented a table at the fair for $30 and set up her work station. Each ornament that she makes costs approximately $2.50 for materials. She sells each ornament for $6.00.

a. If x represents the number of ornaments sold at the craft fair, which of the following expressions would represent Kay's profit? (**Circle *all* choices that apply.**)

A. $-30 + 6x - 2.50x$ ⟵ circled

B. $6x - 30 - 2.50x$ ⟵ circled

C. $6x - 30$

D. $4.50x - 30$

E. $3.50x - 30$ ⟵ circled

Profit = Earnings - Costs

b. Kay does not want to lose money on her business. Her mother told her she needs to sell enough ornaments to at least cover her expenses (costs for materials and table rental). Kay figures that if she sells 8 ornaments, she covers her expenses and does not lose any money. Do you agree? Explain and show work to support your answer.
   1. Select one of your answers from part a.
   2. Substitute 8 for the variable and solve to find her profit.
   3. What does the answer mean? Is it greater than zero or less than zero?

$3.50x - 30$
$3.50(8) - 30$
$28 - 30 = -2$

I (circle one) agree / ~~disagree~~ (disagree circled) with Kay because ___Selling 8 ornaments covers most of her costs but still leaves her $2 in debt.___

c. Kay feels that if she earns a profit of $40.00 at this craft fair, her business will be successful enough for her to branch out to other craft fairs. How many ornaments does she have to sell to earn a $40.00 profit?
   1. Select one of your answers from part a. to use as an expression for profit.
   2. Try different numbers of ornaments to see how many would be required to result in a $40 profit. Show all work!

or Solve using algebra ⟶

$3.50x + 30 = 40$
$\quad\quad +30 \;|\; +30$
$\dfrac{3.50x}{3.50} = \dfrac{70}{3.50}$
$x = 20$

Kay must sell 20 ornaments to earn a $40 profit

3. Travis received a letter from his bank saying that his checking account balance fell below zero. His account transaction log is shown below.

CHECK NO.	DATE	DESCRIPTION OF TRANSACTION	PAYMENT	DEPOSIT	BALANCE	
---	10/17	Beginning Balance	---	---	$367.50	
1125	10/18	CBC Audio (Headphones)	$62.00		−62.00	
					$305.50	Line 1
1126	10/22	NY Sport (Basketball Shoes)	$87.00		−87.00	
					$218.50	Line 2
Debit	10/25	Gary's Country Market	$38.50		−38.50	
					$180.00	Line 3
1127	10/25	Iggy's Skate Shop (Skateboard)	$188.00		−188.00	
					$8.00	Line 4
	10/25	Cash Deposit (Birthday Money)		$20.00	+20.00	
					$28.00	Line 5
Debit	10/30	McDonuts	$5.95		−5.95	
					$22.05	Line 6

a. On which line did Travis make a mathematical error? Explain Travis's mistake.

On Line __4__ Travis made an error because he _Subtracted $188 from $180 and got a positive answer. The difference should be -$8._

b. The bank charged Travis a $20 fee because his balance dropped below $0. He knows that he currently has an outstanding charge for $7.85 that he has not recorded yet. How much money will Travis have to deposit into his account so that the outstanding charge does not create another bank fee? Explain.
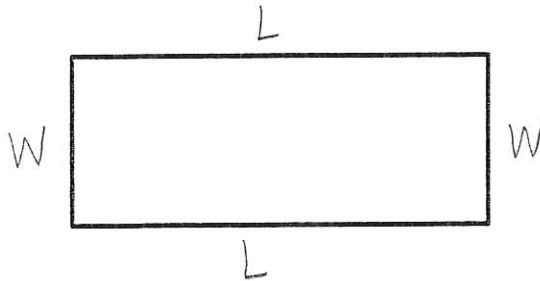
1. Calculate correct ending balance: __$6.05__

2. Add bank fee: __6.05__ + (- __20__) = __-13.95__
   (correct ending balance from 1.)

3. This plus the $7.85 outstanding charge is what he must deposit. -13.95 + (-7.85) = -21.80
   He must deposit $ __21.80__

4. A fence surrounds a rectangular field. The total amount of fencing used to surround the field is 42 feet.

$$L$$

$$W \quad \boxed{} \quad W$$

$$L$$

a. Write an equation that represents the perimeter of the fence. (Hint: Use L for length and W for width)

$$L + W + L + W = 42$$

b. If the length of the fence is 2 times its width, write an equation that represents this relationship.

$$L = 2W$$

c. What is the length and width of the fence?

* may solve
Part c. using
any method as
long as you
show all work

$$L + W + L + W = 42$$

$$2L + 2W = 42$$

$$2(2W) + 2W = 42$$

$$4W + 2W = 42$$

$$\frac{6W}{6} = \frac{42}{6}$$
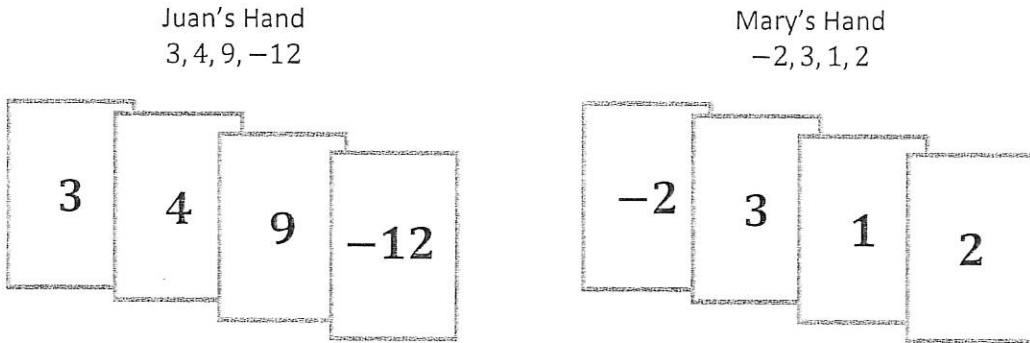
$$\boxed{W = 7 \text{ ft}}$$

$$\boxed{L = 7(2) = 14 \text{ ft}}$$

$$\checkmark: \quad 7 + 14 + 7 + 14 \overset{?}{=} 42$$

$$42 = 42 \checkmark$$

No Calculator!

5. Juan and Mary are playing the Integer Card Game. The cards in their hands are shown below:

Juan's Hand
$3, 4, 9, -12$

Mary's Hand
$-2, 3, 1, 2$

| 3 | 4 | 9 | -12 |

| -2 | 3 | 1 | 2 |

a. What are the scores in each of their hands? **Show all work!**

Juan's score: ___4___

$3 + 4 + 9 + (-12)$
$16 + (-12) = 4$

Mary's score: ___4___

$-2 + 3 + 1 + 2$
$-2 + 6 = 4$

b. Lydia says that if Juan and Mary both take away their 3's, Juan's score will be higher than Mary's. Marcus argues and says that Juan and Mary's scores will be equal. Are either of them right? Explain.

(Circle one) (Marcus) / Lydia is correct. I know this because both of their scores would decrease by the same amount (3). Their new scores would be 1.

c. Juan picks up another set of cards that is exactly like each card in his hand. What is his score now? $4+4=8$

Which of the following would make Mary's score equal to Juan's? <u>Place a check mark ✓ by all that apply.</u>

✓ Double every card in her hand
$4+4=8$

✓ Pick up a 4 $+4$

✓ Pick up a 7 and -3 $7+(-3)=4$

___ Take away her 3 and 1

___ Take away her 2 and -2

✓ Pick up one of each of Juan's cards $3+4+9+(-12)=4$
$4+4=8$

Explain why your selections will make Juan's and Mary's scores equal.

Each choice I selected would add 4 to Mary's total, for a new total of 8. This matches Juan's new total of 8