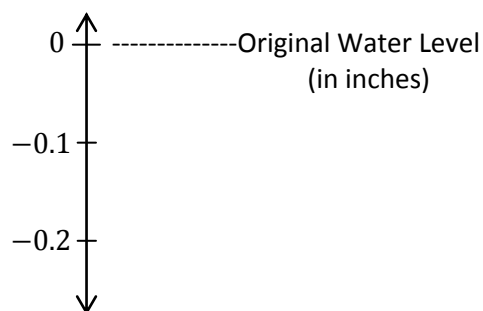Name _____   Date _____

1. The water level in Ricky Lake changes at an average of $-\dfrac{7}{16}$ 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.

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

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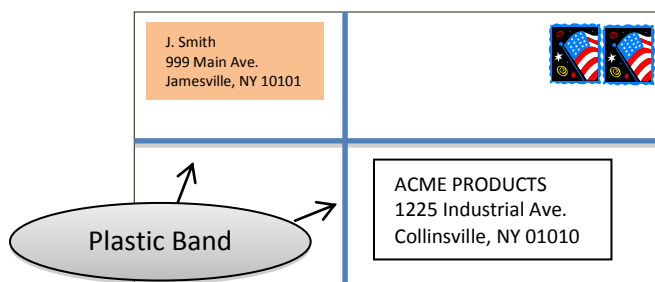
2. Kay's mother taught her how to make handmade ornaments to sell at a craft fair. Kay rented a table at the fair for $30 and set up her work station. Each ornament that she makes costs approximately $2.50 for materials. She sells each ornament for $6.00.

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

      A. $-30 + 6x - 2.50x$

      B. $6x - 30 - 2.50x$

      C. $6x - 30$

      D. $4.50x - 30$

      E. $3.50x - 30$

   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.

   c. Kay feels that if she earns a profit of $40.00 at this craft fair, her business will be successful enough to attend other craft fairs. How many ornaments does she have to sell to earn a $40.00 profit? Write and solve an equation; then explain how the steps and operations used in your algebraic solution compare to an arithmetic solution.

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' mistake.

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.

4. The length of a rectangular envelope is $2\frac{1}{2}$ times its width. A plastic band surrounds the front and back of the envelope to secure it as shown in the picture. The plastic band is $39\frac{3}{8}$ inches long. Find the length and width of the envelope.

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Plastic Band

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 |
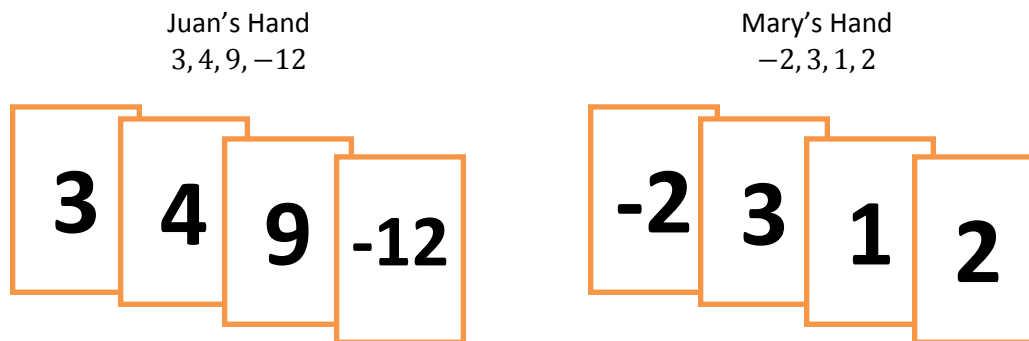
a. What are the scores in each of their hands?

Juan's score: Mary's score:

b. Lydia says that if Juan and Mary both take away their 3s, 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.

c. Juan picks up another set of cards that is exactly like each card in his hand. Which of the following would make Mary's score equal to Juan's? Place a check mark ✓ by all that apply.

_____Double every card in her hand   _____Take away her 3 and 1

_____Pick up a 4   _____Take away her 2 and d -2

_____Pick up a 7 and -3 _____Pick up one of each of Juan's cards

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

A Progression Toward Mastery					
Assessment Task Item		**STEP 1** **Missing or incorrect answer and little evidence of reasoning or application of mathematics to solve the problem**	**STEP 2** **Missing or incorrect answer but evidence of some reasoning or application of mathematics to solve the problem**	**STEP 3** **A correct answer with some evidence of reasoning or application of mathematics to solve the problem, or an incorrect answer with substantial evidence of solid reasoning or application of mathematics to solve the problem**	**STEP 4** **A correct answer supported by substantial evidence of solid reasoning or application of mathematics to solve the problem**
1	**a** **7.NS.A.2b**	Student incorrectly calculated the water level change with either no model shown or the model shown does not relate to the answer given.	Student set the problem up correctly but made an error in computation resulting in an incorrect value AND incorrectly modeled their answer.	Student used a sound process to determine and model the answer on the number line, but a computational error resulted in an incorrect value. OR Student correctly calculated a change of $-\frac{7}{48}$ inches, but had an error in the number line representation.	Student correctly stated that the water level changes $-\frac{7}{48}$ inches after one year AND correctly modeled the change on the number line.
	b **7.NS.A.2a**	Student answer is incorrect. Student work showed little or no understanding of how to find the water level change over a 7 year period.	Student used an appropriate method to find the water level change, but a computational error resulted in an incorrect value AND did not correctly interpret that value to describe the change.	Student used an appropriate method to find and express the 7 year water level change, but a computational error resulted in an incorrect value. OR Student stated a change of $1\frac{1}{48}$ inches but did not indicate the sign or direction of that change.	Student correctly stated $-1\frac{1}{48}$ inch change in the water level over a 7 year period AND used an appropriate method to obtain answer.
	c **7.NS.A.2d**	Student was unable to demonstrate correct use of the long-division algorithm.	Student showed partial understanding of the long-division algorithm but did not complete the process.	Student used long division to determine and justify the decimal form of the answer, but a computational error resulted in an incorrect value. OR Student	Student correctly used the long division algorithm to determine that $1\frac{1}{48}$ is the repeating decimal $1.0208\overline{3}$ (or that $-1\frac{1}{48}$ equals

				showed the correct long-division work to arrive at a decimal remainder, but did not use a repeat bar to indicate a repeat pattern.	$-1.0208\overline{3}$). OR Student used the long-division algorithm to correctly determine and state the decimal form of a different answer that was recorded in part (b).
2	**a** **7.EE.A.2**	Student did not circle any of A, B, or E. OR Student circled only one of A, B, and E and circled C and/or D. OR Student circled all choices. OR Student did not circle any choices.	Student circled only two of A, B, and E and also circled C or D. OR Student circled only one of A, B, and E.	Student circled only two out of A, B, and E.	Student circled only choices A, B, and E.
	b **7.NS.A.3**	Student showed some accuracy in mathematical computation, but the work was not relevant. Student failed to provide an explanation or provided an incorrect explanation.	Student arrived at a value of -2 for the amount of money Kay made from selling 8 ornaments but incorrectly agreed with the claim OR did not make a statement to agree or disagree.	Student arrived at a value of -2 for the amount of money Kay made from selling 8 ornaments and disagreed with the statement, but did not provide a complete explanation. OR Due to a minor computational error, student arrived at an incorrect answer but included a sound explanation based on that numerical answer.	Student correctly disagreed with the statement AND supported the answer with the appropriate work. For instance, student showed that: $3.50(8) - 30 = -2$, which means Kay would have lost $2.
	c **7.NS.A.3** **7.EE.B.4a**	Student answer is incorrect. Little or no evidence of reasoning is provided.	Student answer is incorrect but shows some evidence of reasoning through the use of an equation and/or arithmetic steps to model and solve the problem (though the model used may be incorrect).	Student used a correct equation and method (e.g., $3.50x - 30 = 40$ and found 20 to be the number of ornaments Kay must sell) but did not provide an explanation for how the steps or solution compared to an arithmetic solution. OR Student used a correct equation and method and related it to an arithmetic model but made a computational error resulting in an incorrect value.	Student correctly stated that Kay must sell 20 ornaments to earn a $40 profit AND included a correct equation and related the steps in the solution to an arithmetic model with no errors in the steps taken to arrive at the answer.

3	a 7.NS.A.1	Student did not provide a correct explanation. Student identified a different line and showed little or no evidence of understanding integer subtraction.	Student correctly identified line 4 but did not explain the mistake or state a correct value for line 4 OR made an error in computation and stated an incorrect value for line 4. OR The student identified another line as being Travis' mistake, due to a computational error, but showed an understanding of integer subtraction.	Student correctly identified line 4 and stated that the value should instead be – $8 but did not clearly explain the mistake. OR Student clearly explained the mistake, but did not provide the correct value.	Student correctly identified line 4, stated that Travis mistakenly obtained a positive difference from 180 – 188, AND stated that the value on line 4 should instead be – $8.
	b 7.NS.A.1	Student was unable to answer the question accurately. Student made several errors in calculating the correct account balance and necessary deposit, which showed a limited level of understanding.	Student used an incorrect beginning balance (such as $22.05 from line 6) to calculate the new account balance but performed all other calculations correctly and explained that the account balance needs to be at least $0. OR Student corrected Travis' initial error and arrived at an account balance of $6.05 but did not complete the other necessary steps to determine the deposit needed.	Student answered incorrectly due to a computational error, but used a sound process and valid explanation of how much Travis should deposit into the account (based on the incorrect value). OR Student showed a correct process and arrived at a new balance amount of – $21.80 but did not provide a complete explanation of how much money Travis needed to deposit.	Student calculated the correct account balance of – $21.80 showing appropriate work, stated the need for a deposit of $21.80 or more to avoid overdraft, AND explained that the deposit is necessary to reach a balance of at least $0.
4	7.NS.A.3 7.EE.B.4a	Student answered incorrectly and shows little or no understanding of how to find the missing dimensions of the envelope.	Student used a valid process to arrive at either a correct length of $14\frac{1}{16}$ inches or width of $5\frac{5}{8}$ inches but did not provide both dimensions. OR Student related the length and width backwards, resulting in a length of $5\frac{5}{8}$ inches and a width of $14\frac{1}{16}$ inches.	Student provided appropriate work and correct numerical values for the answer but without the units of measure. OR Student provided incorrect answer values based on a computational error, but used a valid method (i.e., $2w + 5w = 39.375$) and showed correct steps.	Student correctly answered a length of $14\frac{1}{16}$ inches and width of $5\frac{5}{8}$ inches AND provided error-free work to support the answer.

| 5	a 7.NS.A.1	Student was unable to correctly answer the question. Student work was missing or did not demonstrate an adequate understanding of integer addition.	Student correctly indicated that Juan and Mary each have scores of 4 but did not show supporting work.	Student calculated and showed that one of the scores is 4, but for the other hand, a computational error was made resulting in a different value.	Student correctly calculated and showed that Juan and Mary each have scores of 4.
	b 7.NS.A.1	Student stated that Lydia is correct OR stated that neither person is correct.	Student stated that Marcus is correct but provided no explanation as to why.	Student stated that Marcus is correct, but the explanation is incomplete.	Student stated that Marcus is correct AND provided a valid argument as justification.
	c 7.NS.A.3	Student checked both of the incorrect choices and the written explanation shows little or no understanding.	Student placed check marks by only two of the correct choices (and possibly one of the incorrect choices). Student explanation indicated a limited level of understanding.	Student provided all but one of the following: - Student placed check marks by only the four correct answers; - Student explained that Juan's score is 8 because it was doubled; - Student accurately explained why the selections will make the scores equal. OR Student checked only 3 of the 4 correct choices but appropriately addressed all other parts of the question.	Student placed check marks by only the four correct answers, explained that Juan's score is 8 because it was doubled, AND accurately explained why the selections will make the scores equal.

Name _____   Date _____

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.

$$\frac{-7}{16} \div 3 \Rightarrow \frac{-7}{16} \cdot \frac{1}{3} \Rightarrow \frac{-7}{48} \text{ inches}$$

$$\begin{array}{r} 0.145... \\ 48\overline{)7.000} \\ \underline{-48}\downarrow \\ 220 \\ \underline{-192}\downarrow \\ 280 \\ 240 \\ \hline 40 \end{array}$$

0 ------------- Original Water Level (in inches)

-0.1

$-\frac{7}{48}$

-0.2
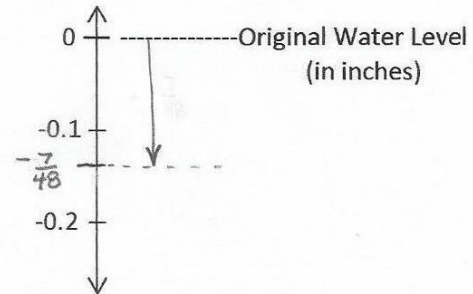
    b. How much would the water level change over a 7 year period?

$$\begin{aligned} \text{distance} &= \text{rate} \cdot \text{time} \\ &= -\frac{7}{48} \cdot 7 \\ &= -\frac{49}{48} \\ &= -1\frac{1}{48} \text{ inches} \end{aligned}$$

The water level drops $1\frac{1}{48}$ inches over a 7 year period.

    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.

$$\begin{array}{r} 0.020833 \\ 48\overline{)1.000000} \\ \underline{-96}\downarrow \\ 40 \\ \underline{-00}\downarrow \\ 400 \\ \underline{-384}\downarrow \\ 160 \\ \underline{-144}\downarrow \\ 160 \end{array}$$

$-1\frac{1}{48}$ written in decimal form is a repeating decimal because when converted using long division, the remainder repeats after the hundred-thousandths place.

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

    Ⓐ $-30 + 6x - 2.50x$
    Ⓑ $6x - 30 - 2.50x$
    C. $6x - 30$
    D. $4.50x - 30$
    Ⓔ $3.50x - 30$

    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.

    $$3.50x - 30$$
    $$3.50(8) - 30$$
    $$(24 + 4) - 30$$
    $$28 - 30$$
    $$-2$$

    I disagree 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 to attend other craft fairs. How many ornaments does she have to sell to earn a $40.00 profit? Write and solve an equation; then explain how the steps and operations used in your algebraic s solution compare to an arithmetic solution.

    $$3.50x - 30 = 40$$
    $$3.50x - 30 + 30 = 40 + 30$$
    $$3.50x + 0 = 70$$
    $$3.50x = 70$$
    $$3.50x \cdot \left(\frac{1}{3.50}\right) = 70 \cdot \left(\frac{1}{3.50}\right)$$
    $$1 \cdot x = 20$$
    Kay must sell 20 ornaments.

    $$\begin{array}{r} 20. \\ 3.5\overline{)70.0} \\ -70\downarrow \\ \hline 00 \\ 00 \\ \hline \end{array}$$

    To find the answer arithmetically, I would have to combine the $40 profit and $30 rental fee, then divide that sum ($70) by the $3.50 that she earns per ornament after costs.

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' mistake.

> On line 4, Travis subtracted $188 from $180 and got a positive answer. The difference should be -$8.00.

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.

> Starting at Line 3: $$\begin{array}{r} 180.00 \\ -\ 188.00 \\ \hline -\ 8.00 \\ +\ 20.00 \\ \hline 12.00 \\ -\ 5.95 \\ \hline \$6.05 \end{array}$$
>
> Travis' actual balance should be $6.05.
>
> $6.05 + (-20.00)$ overdraft fee
> $|-20.00| - |6.05|$
> $\quad -13.95$
> $-13.95 + (-7.85)$ outstanding charge
> $|-13.95| + |-7.85|$
> $\quad -21.80$
>
> To get his account back to 0 Travis needs to deposit $21.80 or more to avoid another overdraft fee.

4. The length of a rectangular envelope is $2\frac{1}{2}$ times its width. A plastic band surrounds the front and back of the envelope to secure it as shown in the picture. The plastic band is $39\frac{3}{8}$ inches long. Find the length and width of the envelope.

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Plastic Band	ACME PRODUCTS 1225 Industrial Ave. Collinsville, NY 01010
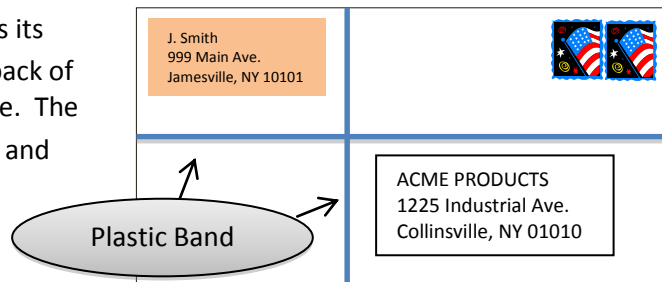
The length of the plastic band is equivalent to the perimeter of the envelope.

length = $2\frac{1}{2} \cdot$ width

$w + w + (2\frac{1}{2} \cdot w) + (2\frac{1}{2} \cdot w) = 39\frac{3}{8}$

$2w + 5w = 39\frac{3}{8}$

$7w = 39\frac{3}{8}$

$\dfrac{7w}{7} = \dfrac{39\frac{3}{8}}{7}$

$w = 5\dfrac{35 \div 7}{56 \div 7}$

$w = 5\frac{5}{8}$ inches

$39\frac{3}{8} \Rightarrow \frac{315}{8}$

$\frac{315}{8} \div 7$

$\frac{315}{8} \cdot \frac{1}{7}$

$\frac{315}{56}$

$\begin{array}{r} 39 \\ \times\ \ 8 \\ \hline 312 \\ +\ \ 3 \\ \hline 315 \end{array}$

$\begin{array}{r} 5\ \ \ \\ 56\overline{)315} \\ 280 \\ \hline 35 \end{array}$

length = $2\frac{1}{2} \cdot 5\frac{5}{8}$
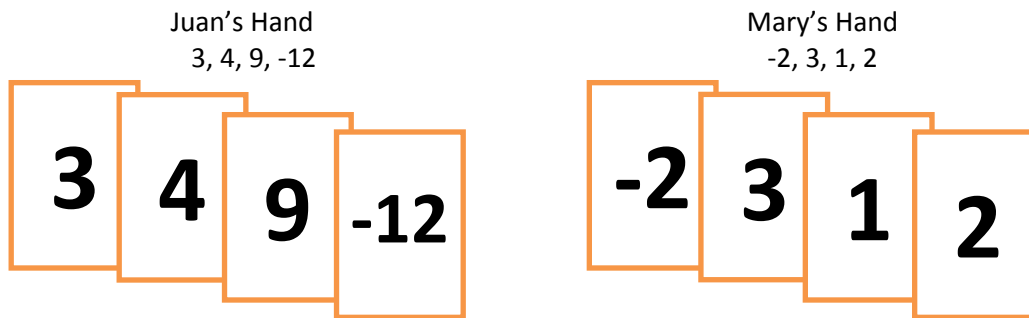
$= \frac{5}{2} \cdot \frac{45}{8}$

$= \frac{225}{16}$

$= 14\frac{1}{16}$ inches

$\begin{array}{r} 45 \\ \times\ \ 5 \\ \hline 225 \end{array}$

$\begin{array}{r} 14\ \ \ \\ 16\overline{)225} \\ -16\downarrow \\ \hline 65 \\ -64 \\ \hline 1 \end{array}$

The length of the envelope is $14\frac{1}{16}$ inches and the width of the envelope is $5\frac{5}{8}$ inches.

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

3 **4** **9** **-12**

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

-2 **3** **1** **2**

a. What are the scores in each of their hands?

Juan's score: ④
3 + 4 + 9 + (-12)
7 + 9 + (-12)
16 + (-12)
4

Mary's score: ④
-2 + 3 + 1 + 2
1 + 1 + 2
4

b. Lydia says that if Juan and Mary both take away their 3s, 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.

If both Juan and Mary lay down their 3's, then both of their totals will be decreased by 3. Since both of their totals are 4, laying down a 3 would make both scores 1. Juan's score and Mary's score would be equal. So Marcus is correct.

c. Juan picks up another set of cards that is exactly like each card in his hand. Which of the following would make Mary's score equal to Juan's? Place a check mark ✓ by all that apply.

✓ Double every card in her hand
   + total of 4

✓ Pick up a 4
   + 4

✓ Pick up a 7 and -3
   + 4

_____ Take away her 3 and 1

_____ Take away her 2 and -2

✓ Pick up one of each of Juan's cards
   + 4

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

Juan's total doubles because every card in his hand doubled, so his total is 8. Each choice I selected would add 4 to Mary's total to make it 8.