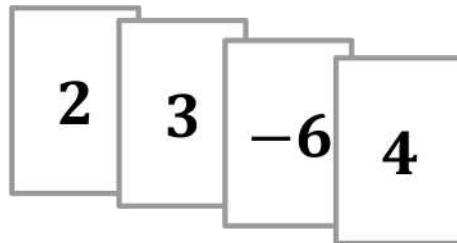


Name _____

Date _____

Understanding Multiplication of Integers

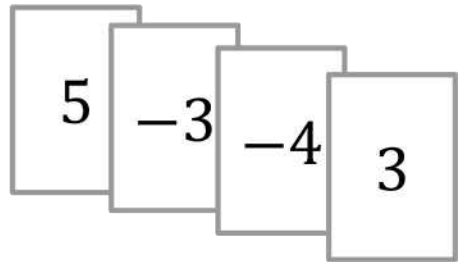
1. Natalie is playing the Integer Game and only shows you the four cards shown below. She tells you that the rest of her cards have the same values on them and match one of these four cards.



- a. If all of the matching cards will increase her score by 18, what are the matching cards?
- b. If all of the matching cards will decrease her score by 12, what are the matching cards?
2. A hand of six integer cards has one matching set of two or more cards. If the matching set of cards is removed from the hand, the score of the hand will increase by six. What are the possible values of these matching cards? Explain. Write an equation using multiplication showing how the matching cards yield an increase in score of six.

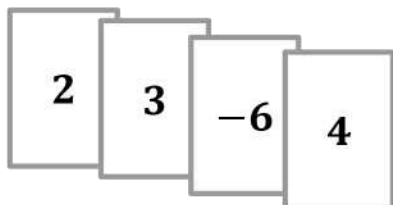
1. Describe sets of two or more matching integer cards that satisfy the criteria in each part below:
 - a. Cards increase the score by eight points.
 - b. Cards decrease the score by 9 points.
 - c. Removing cards that increase the score by 10 points.
 - d. Positive cards that decrease the score by 18 points.

2. You have the integer cards shown at the right when your teacher tells you to choose a card to multiply four times. If your goal is to get your score as close to zero as possible, which card would you choose? Explain how your choice changes your score.



3. Sherry is playing the Integer Game and is given a chance to discard a set of matching cards. Sherry determines that if she discards one set of cards her score will increase by 12. If she discards another set, then her score will decrease by eight. If her matching cards make up all six cards in her hand, what cards are in Sherry's hand? Are there any other possibilities?

1. Natalie is playing the Integer Game and only shows you the four cards shown below. She tells you that the rest of her cards have the same values on them and match one of these four cards.



- a. If all of the matching cards will increase her score by 18, what are the matching cards?

If there were nine 2 cards, then $2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 18$
 $9 \times 2 = 18$

If there were six 3 cards, then $3 + 3 + 3 + 3 + 3 + 3 = 18$
 $6 \times 3 = 18$

- b. If all of the matching cards will decrease her score by 12, what are the matching cards?

If there were two -6 cards, then $(-6) + (-6) = -12$
 $2 \times (-6) = -12$

2. A hand of six integer cards has one matching set of two or more cards. If the matching set of cards is removed from the hand, the score of the hand will increase by six. What are the possible values of these matching cards? Explain. Write an equation using multiplication showing how the matching cards yield an increase in score of six.

If the matching cards are taken away from the playing hand and the score of the hand increases, then the matching cards must have negative values. The playing hand only has six cards so the number of matching cards is limited to six. Taking away the following matching sets would increase the score by six:

Taking away one set of two -3 cards can be represented by $-(-3) - (-3)$
 $3 + 3 = 6$
 $3 \times 2 = 6$ or $(-3) \times (-2) = 6$

Taking away one set of three -2 cards can be represented by $-(-2) - (-2) - (-2)$
 $2 + 2 + 2 = 6$
 $2 \times 3 = 6$ or $(-2) \times (-3) = 6$

Taking away one set of six -1 cards can be represented by $-(-1) - (-1) - (-1) - (-1) - (-1) - (-1)$
 $1 + 1 + 1 + 1 + 1 + 1 = 6$
 $1 \times 6 = 6$ or $(-1) \times (-6) = 6$

1. Describe sets of two or more matching integer cards that satisfy the criteria in each part below:

a. Cards increase the score by eight points.

Picking up: eight 1's, four 2's, or two 4's

OR

Removing: eight -1's, four -2's, or two -4's

b. Cards decrease the score by 9 points.

Picking up: nine -1's or three -3's

OR

Removing: nine 1's or three 3's

c. Removing cards that increase the score by 10 points.

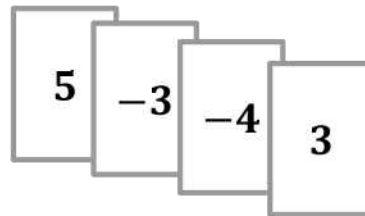
Ten -1's, five -2's or two -5's

d. Positive cards that decrease the score by 18 points.

Removing eighteen 1's, nine 2's, six 3's, three 6's, or two 9's.

2. You have the integer cards shown at the right when your teacher tells you to choose a card to multiply four times. If your goal is to get your score as close to zero as possible, which card would you choose? Explain how your choice changes your score.

The best choice to multiply is the -3. The cards currently have a score of one. The new score with the -3 multiplied by 4, is -8. The scores where the other cards are multiplied by 4 are 10, -11, and 16; all further from zero.



3. Sherry is playing the Integer Game and is given a chance to discard a set of matching cards. Sherry determines that if she discards one set of cards her score will increase by 12. If she discards another set, then her score will decrease by eight. If her matching cards make up all six cards in her hand, what cards are in Sherry's hand? Are there any other possibilities?

There are two possibilities:

2, 2, 2, 2, -6, -6

OR

-3, -3, -3, -3, 4, 4