Name _____     Date_____

# Multiplication and Division of Rational Numbers

Harrison made up a game for his math project. It is similar to the Integer Game; however, in addition to integers, there are cards that contain other rational numbers such as $-0.5$ and $-0.25$. Write a multiplication or division equation to represent each problem below. Show all related work.

1. Harrison discards three $-0.25$ cards from his hand. How does this affect the overall point value of his hand? Write an equation to model this situation.

2. Ezra and Benji are playing the game with Harrison. After Ezra doubles his hand's value, he has a total of $-14.5$ points. What was his hand's value before he doubled it?

3. Benji has four $-0.5$ cards. What is his total score?

1. At lunch time, Benjamin often borrows money from his friends to buy snacks in the school cafeteria. Benjamin borrowed $0.75 from his friend Clyde five days last week to buy ice cream bars. Represent the amount Benjamin borrowed as the product of two rational numbers; then, determine how much Benjamin owed his friend last week.

2. Monica regularly records her favorite television show. Each episode of the show requires 3.5% of the total capacity of her video recorder. Her recorder currently has 62% of its total memory free. If Monica records all five episodes this week, how much space will be left on her video recorder?

For Problems 3–5, find at least two possible sets of values that will work for each problem.

3. Fill in the blanks with two rational numbers (other than 1 and $-1$). ___ $\times \left(-\frac{1}{2}\right) \times$ ___ $= -20$

   What must be true about the relationship between the two numbers you chose?

4. Fill in the blanks with two rational numbers (other than 1 and $-1$). $-5.6 \times 100 \div 80 \times$ ___ $\times$ ___ $= 700$

   What must be true about the relationship between the two numbers you chose?

5. Fill in the blanks with two rational numbers. ___ $\times$ ___ $= -0.75$

   What must be true about the relationship between the two numbers you chose?

For Problems 6–8, create word problems that can be represented by each expression, and then represent each product or quotient as a single rational number.

6. $8 \times (-0.25)$

7. $-6 \div \left(1\frac{1}{3}\right)$

8. $-\frac{1}{2} \times 12$

Harrison made up a game for his math project. It is similar to the Integer Game; however, in addition to integers, there are cards that contain other rational numbers such as $-0.5$ and $-0.25$. Write a multiplication or division equation to represent each problem below. Show all related work.

1. Harrison discards three $-0.25$ cards from his hand. How does this affect the overall point value of his hand? Write an equation to model this situation.

   $-3\,(-0.25)\ =\ 0.75$

   *The point value of Harrison's hand will increase by $0.75$ points.*

2. Ezra and Benji are playing the game with Harrison. After Ezra doubles his hand's value, he has a total of $-14.5$ points. What was his hand's value before he doubled it?

   $-14.5 \div 2\ =\ -7.25$

   *Before Ezra doubled his hand, his hand had a point value of $-7.25$.*

3. Benji has four $-0.5$ cards. What is his total score?

   $4 \times (-0.5)\ =\ -2.0$

   *Benji's total score is $-2.0$ points.*

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1. At lunch time, Benjamin often borrows money from his friends to buy snacks in the school cafeteria. Benjamin borrowed $\$0.75$ from his friend Clyde five days last week to buy ice cream bars. Represent the amount Benjamin borrowed as the product of two rational numbers; then, determine how much Benjamin owed his friend last week.

   $5\,(-0.75) = -3.75$

   *Benjamin owed Clyde $\$3.75$.*

2. Monica regularly records her favorite television show. Each episode of the show requires $3.5\%$ of the total capacity of her video recorder. Her recorder currently has $62\%$ of its total memory free. If Monica records all five episodes this week, how much space will be left on her video recorder?

   $62 + 5(-3.5) = 62 + (-17.5) = 44.5$

   *Monica's recorder will have $44.5\%$ of disk space left.*

For Problems 3–5, find at least two possible sets of values that will work for each problem.

3. Fill in the blanks with two rational numbers (other than $1$ and $-1$). $\underline{\ \ \ } \times \left(-\frac{1}{2}\right) \times \underline{\ \ \ } = -20$

   What must be true about the relationship between the two numbers you chose?

   *Answers may vary. Two possible solutions are $10$ and $4$ or $-10$ and $-4$. The two numbers must be factors of $40$, and they must both have the same sign.*

4. Fill in the blanks with two rational numbers (other than $1$ and $-1$). $\quad -5.6 \times 100 \div 80 \times$ ___ $\times$ ___ $= 700$

What must be true about the relationship between the two numbers you chose?

*Answers may vary. Two possible solutions are $-50$ and $2$ or $25$ and $-4$. The two numbers must be factors of $-100$, and they must both have opposite signs.*

5. Fill in the blanks with two rational numbers. $\quad$ ___ $\times$ ___ $= -0.75$

What must be true about the relationship between the two numbers you chose?

*Answers may vary. Two possible solutions are $-3$ and $0.25$ or $0.5$ and $-1.5$. The two numbers must be factors of $-0.75$, and they must both have opposite signs.*

For Problems 6–8, create word problems that can be represented by each expression, and then represent each product or quotient as a single rational number.

6. $8 \times (-0.25)$

*Answers may vary.*

*Example: Stacey borrowed a quarter from her mother every time she went to the grocery store so that she could buy a gumball from the gumball machine. Over the summer, Stacey went to the grocery store with her mom eight times. What rational number represents the dollar amount change in her mother's money due to the purchase of gumballs?*

*Answer: $-2$*

7. $-6 \div \left(1\frac{1}{3}\right)$

*Answers may vary.*

*Example: There was a loss of $\$6$ on my investment over one-and-a-third months. Based on this, what was the investment's average dollar amount change per month?*

*Answer: $-4.50$*

8. $-\frac{1}{2} \times 12$

*Answers may vary.*

*Example: I discarded exactly half of my card-point total in the Integer Game. If my card-point total was $12$ before I discarded, which rational number represents the change to my hand's total card-point total?*

*Answer: $-6$*