

## Assignment

### LESSON 2: Rational Decisions

#### Write

Match each term with the number that best represents that term.

- |                        |                               |
|------------------------|-------------------------------|
| 1. Irrational number   | a. $\frac{1}{2} = 0.5$        |
| 2. Terminating decimal | b. $0.\overline{3}$           |
| 3. Repeating decimal   | c. $\pi$                      |
| 4. Bar notation        | d. $\frac{5}{9} = 0.555\dots$ |

#### Remember

All rational numbers can be written as terminating or repeating decimals. A *repeating decimal* is a decimal in which one or more digits repeat indefinitely. A *terminating decimal* is a decimal that has a finite number of non-zero digits.

#### Practice

1. Marcy Green is the manager of her high school softball team. She is in charge of equipment, as well as recording statistics for each player on the team. The table shows some batting statistics for the four infielders on the team during the first eight games of the season.

Player	At Bats	Hits
Brynn Thomas	36	16
Hailey Smith	32	12
Serena Rodriguez	33	11
Kata Lee	35	14

- a. In order to compare the batting averages of the players, Marcy must convert all of the ratios of hits to at-bats to decimal form. Determine the batting average for each player, and continue to divide until you see a pattern. Write your answers using both dots and bar notation for repeating decimals.
- b. Write the batting averages of the players in order from lowest to highest. Who has the best batting average so far?
- c. Marcy keeps track of how many home runs each infielder hits on the high school softball team. For each player, the fraction of home runs per at-bats is given in decimal form. Determine how many home runs each player has had so far.
- Brynn:  $0.0\overline{5}$
  - Hailey:  $0.15625$
  - Serena:  $0.\overline{12}$
  - Kata:  $0.2$
2. Tell whether the numbers in each problem are natural numbers, whole numbers, integers, or rational numbers, and state whether those numbers are closed under the operation used.
- a.  $-12 \div (-5)$
- b.  $\frac{3}{7} + (-\frac{3}{8})$

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## Assignment Answers

### Write

- c
- a
- d
- b

### Practice

- 1a. Brynn:  $0.44\dots$ , or  $0.\overline{4}$   
Hailey:  $0.375$   
Serena:  $0.33\dots$ , or  $0.\overline{3}$   
Kata:  $0.4$
- 1b.  $0.\overline{3}$ ,  $0.375$ ,  $0.4$ ,  $0.\overline{4}$   
Brynn has the best batting average so far.
- 1c. Brynn had 2 home runs. Hailey had 5 home runs. Serena had 4 home runs. Kata had 7 home runs.
- 2a. The numbers are integers and rational numbers. The integers are not closed under division, but the rational numbers are closed under division.
- 2b. The numbers are rational numbers. Rational numbers are closed under addition and subtraction.

## Assignment Answers

### Practice

- 3a. 1.4; terminating  
3b.  $0.41\overline{6}$ ; repeating  
3c. 0.625; terminating  
3d.  $0.\overline{72}$ ; repeating  
4a.  $\frac{8}{9}$   
4b.  $\frac{6}{11}$   
4c.  $\frac{7}{90}$   
4d.  $\frac{5}{27}$

### Stretch

No. The set of whole numbers is not closed under  $\star$ . Although the provided examples result in whole numbers, counterexamples are numerous:  $5 \star 2 = 5^5 \div 2 = 1562.5$ , which is not a whole number.

### Review

- 1a. Sample answer.  
These numbers are grouped together because they are all integers.
- 1b. Sample answer.  
These numbers are grouped together because they are all between 0 and 1.
- 2a. Let  $x$  represent the number of baseball player cards, and let  $y$  represent the number of football player cards.
- $$x + y = 97$$
- $$x - y = 39$$
- The solution is (68, 29).  
Pedro has 68 baseball player cards and 29 football player cards.

3. Convert each fraction to a decimal. State whether the fraction is equivalent to a terminating or repeating decimal.

a.  $1\frac{2}{5}$

b.  $\frac{5}{12}$

c.  $\frac{5}{8}$

d.  $\frac{8}{11}$

4. Write each repeating decimal as a fraction.

a.  $0.\overline{8}$

b.  $0.5454\dots$

c.  $0.0777\dots$

d.  $0.\overline{185}$

### Stretch

Numbers can be operated on using operations other than addition, subtraction, multiplication, and division. Let's define a new operation called  $\star$ , where  $2 \star 4 = 2^2 \div 4$  and  $6 \star 3 = 6^6 \div 3$ . Is the set of whole numbers closed under the operation  $\star$ ? That is, does  $a \star b$ , where  $a$  and  $b$  are whole numbers, always result in a whole number? Justify your claim.

### Review

1. Provide a rationale for each grouping of numbers.
- a.  $3, \frac{75}{5}, -18, -\frac{30}{3}$   
b.  $25\%, \frac{7}{11}, 0.912912\dots, 0.5\%$
2. Write and solve a system of equations for each problem situation. Interpret the solution in terms of the context.
- a. Pedro has 97 athlete cards. In his collection, he has 39 more baseball player cards than football player cards. How many of each type of card does Pedro have?
- b. The Ryans are researching venues for their family reunion. The Picnic Place charges \$150 to reserve a picnic shelter and \$20 per hour to use the shelter. Totally Tents charges \$300 for the rental and setup of a tent and \$10 per hour to use their land. When would the cost be the same at both The Picnic Place and Totally Tents? What is that cost?
3. Solve each equation.
- a.  $6(x + 3) = 3(2x + 5) - 3$   
b.  $-5(x + 4) = 2(x - 10)$

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2b. Let  $x$  represent the number of hours, and let  $y$  represent the total cost.

$$y = 150 + 20x$$

$$y = 300 + 10x$$

The solution is (15, 450). A 15-hour reunion would cost \$450 at both The Picnic Place and Totally Tents.

3a. No solutions

3b.  $x = 0$