7-4

Name _____ Date _____

Properties of Rational Numbers

(Pages 290–292)

The properties that are true for adding and multiplying integers are also true for rational numbers.

Commutative:	$a + b = b + a$	$a \cdot b = b \cdot a$
Associative:	$(a + b) + c = a + (b + c)$	$(a \cdot b) \cdot c = a \cdot (b \cdot c)$
Identity:	$a + 0 = a$	$a \cdot 1 = a$

Two numbers whose product is 1 are **multiplicative inverses**, or **reciprocals**, of each other.

EXAMPLES

A What is the reciprocal of $\frac{3}{4}$?

$\frac{3}{4} \cdot \blacksquare = 1$ *Reciprocals multiply to 1.*

$\frac{3}{4} \cdot \frac{4}{3} = 1$

The reciprocal of $\frac{3}{4}$ is $\frac{4}{3}$.

B What is the reciprocal of $1\frac{2}{3}$?

Rename the mixed number as a fraction: $\frac{5}{3}$.

The reciprocal is $\frac{3}{5}$.

Check: Does $1\frac{2}{3} \cdot \frac{3}{5} = 1$? Yes.

Try These Together

1. Name the multiplicative inverse (or reciprocal) of 7.

HINT: Write 7 as $\frac{7}{1}$.

2. Name the multiplicative inverse of $-\frac{1}{2}$.

HINT: The inverse is also a negative number.

PRACTICE

Name the multiplicative inverse of each rational number.

3. $2\frac{6}{7}$ **4.** -0.1 **5.** -9 **6.** 3.75 **7.** $\frac{x}{y}$ **8.** $-q$

Solve each equation using properties of rational numbers.

9. $a = 5 \cdot 6\frac{2}{5}$ **10.** $\left(\frac{3}{4} \cdot \frac{2}{5}\right)\frac{2}{3} = n$ **11.** $s = 16\frac{4}{7} \cdot \frac{5}{8}$

12. $d = -3 \cdot 4\frac{1}{3}$ **13.** $\frac{2}{9} \cdot 9\frac{1}{6} = g$ **14.** $u = -\frac{2}{5}\left(\frac{5}{10} \cdot \frac{5}{7}\right)$

Evaluate each expression if $a = -2\frac{2}{5}$, $b = \frac{3}{4}$, and $c = -\frac{2}{3}$.

15. b^3 **16.** $4b + 5c$ **17.** $a(3 - b)$ **18.** abc

19. **Standardized Test Practice** Solve $5\frac{3}{8} \cdot 4 = x$.

A $22\frac{1}{8}$ **B** $21\frac{1}{2}$ **C** $20\frac{3}{8}$ **D** $6\frac{1}{2}$

Answers: **1.** $\frac{1}{7}$ **2.** -2 **3.** $\frac{7}{20}$ **4.** -10 **5.** $-\frac{1}{9}$ **6.** $\frac{4}{15}$ **7.** $\frac{y}{x}$ **8.** $-\frac{1}{q}$ **9.** 32 **10.** $-\frac{1}{5}$ **11.** $10\frac{5}{14}$ **12.** -13 **13.** $2\frac{1}{27}$ **14.** $-\frac{1}{7}$ **15.** $\frac{27}{64}$ **16.** $-\frac{1}{3}$ **17.** $-5\frac{2}{5}$ **18.** $1\frac{1}{5}$ **19.** B