

# Working with Rational Numbers

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## Mathematics 9 Rational Numbers Working with Rational Numbers

### A. What are Rational Numbers?

**Rational Numbers are any numbers that can be written in the form of a fraction.**  
These include integers (positive or negative whole numbers), fractions, and most decimals (terminating or repeating).

1) Write the following as a fraction.

a) -4

$$\boxed{-4} \quad \text{or} \quad \boxed{-\frac{4}{1}}$$

b) 0.25

$$\frac{25 \div 25}{100 \div 25} = \boxed{\frac{1}{4}}$$

c) 0.3

$$\frac{3 \div 3}{9 \div 3} = \boxed{\frac{1}{3}}$$

Place value minus one

d) 2.6

$$\text{Whole: } \frac{2 \frac{6 \div 2}{10 \div 2}}{} = \boxed{2\frac{3}{5}}$$

e) -5.27

$$\text{integer: } -5 \frac{27 \div 9}{99 \div 9} = \boxed{-5\frac{3}{11}}$$

f)  $7\frac{1}{5}$

$$\boxed{7\frac{1}{5} \text{ or } \frac{36}{5}}$$

### B. Simplifying Rational Numbers

Simplifying Rational Numbers means to reduce the fraction to its lowest terms or its simplest form. When reducing, we are looking for the largest number which divides evenly into both the numerator (top number) and the denominator (bottom number). If you don't choose the largest number, you can still get the fraction reduced, it just might take you a bit longer. Remember to be careful with the negatives!

$$\frac{-12}{-60} = \frac{12 \div 12}{60 \div 12} = \boxed{\frac{1}{5}}$$

$$\frac{-12}{60} = \frac{-12 \div 2}{60 \div 2} = \frac{-6 \div 2}{30 \div 2} = \frac{-3 \div 3}{15 \div 3} = \boxed{-\frac{1}{5} \text{ or } -\frac{1}{5}}$$

$$\frac{12}{-60} = -\frac{12 \div 12}{60 \div 12} = \boxed{-\frac{1}{5} \text{ or } -\frac{1}{5}}$$

$$-\frac{12}{60} = -\frac{12 \div 12}{60 \div 12} = \boxed{-\frac{1}{5} \text{ or } -\frac{1}{5}}$$

### C. Changing Mixed Numbers to Improper Fractions

Rational numbers which are greater than one can be written in two different ways: Mixed Numbers or Improper Fractions. Remember that the negative applies to the entire fraction.

$$\text{multiply} \quad \left(5\frac{1}{2}\right)_{\text{add}} = \boxed{\frac{11}{2}}$$

$$\text{multiply} \quad -2\frac{3}{5} = \boxed{-\frac{13}{5} \text{ or } \frac{-13}{5}}$$

$$7\frac{3}{4} = \boxed{\frac{31}{4}}$$

### D. Changing Improper Fractions to Mixed Numbers

$$\frac{20}{3} \quad 20 \div 3 = \boxed{6\frac{2}{3}}$$

$$\frac{-15}{4} \quad 15 \div 4 = \boxed{-3\frac{3}{4}}$$

$$\frac{-32}{9} \quad 32 \div 9 = \boxed{-3\frac{5}{9}}$$

#### D. Practice Questions

1) Write the following as a fraction.

a)  $0.\overline{8}$

$$= \boxed{\frac{8}{9}}$$

b) 2.04

$$2 \frac{4}{100} = 2 \frac{1}{25}$$

c) -6

$$\boxed{-\frac{6}{1}} \text{ or } \boxed{-\frac{6}{1}}$$

2) Simplify the following fractions.

a)  $\frac{25}{35} = \boxed{\frac{5}{7}}$

b)  $\frac{-32}{-48} = \boxed{\frac{2}{3}}$

c)  $-\frac{54}{90} = \boxed{-\frac{3}{5}}$

3) Change the following Mixed Numbers to Improper Fractions.

a)  $4\frac{1}{3} = \boxed{\frac{13}{3}}$

b)  $6\frac{3}{4} = \boxed{\frac{27}{4}}$

c)  $-8\frac{2}{5} = \boxed{-\frac{42}{5}}$

4) Change the following Improper Fractions to Mixed Numbers.

a)  $\frac{15}{4} = \boxed{3\frac{3}{4}}$

b)  $\frac{-22}{3} = \boxed{-7\frac{1}{3}}$

c)  $-\frac{35}{8} = \boxed{-4\frac{3}{8}}$

Assignment: Working With Rational Numbers Assignment

Name: \_\_\_\_\_

Simplifying Rational Numbers

$$1. \frac{-36}{48} =$$

$$2. \frac{9}{-18} =$$

$$3. \frac{-45}{-63} =$$

$$4. \frac{24}{40} =$$

$$5. \frac{36}{64} =$$

$$6. \frac{20}{-30} =$$

$$7. \frac{-48}{-64} =$$

$$8. \frac{-25}{40} =$$

$$9. \frac{64}{24} =$$

$$10. \frac{-14}{42} =$$

Name: \_\_\_\_\_

Changing the Form of Rational Numbers

A. Change the following to Improper Fractions.

$$1. \ 2\frac{3}{5} =$$

$$2. \ -3\frac{1}{8} =$$

$$3. \ -1\frac{1}{4} =$$

$$4. \ 6\frac{1}{2} =$$

$$5. \ -4\frac{2}{3} =$$

$$6. \ 10\frac{1}{4} =$$

$$7. \ -7\frac{4}{5} =$$

$$8. \ -9\frac{6}{7} =$$

$$9. \ 5\frac{3}{11} =$$

$$10. \ 8\frac{1}{8} =$$

B. Change the following to Mixed Numbers.

$$1. \frac{-10}{3} =$$

$$2. \frac{15}{4} =$$

$$3. \frac{-36}{-8} =$$

$$4. -\frac{12}{5} =$$

$$5. \frac{21}{-8} =$$

$$6. \frac{36}{7} =$$

$$7. \frac{27}{-12} =$$

$$8. -\frac{60}{7} =$$

$$9. \frac{-25}{-6} =$$

$$10. -\frac{-59}{-12} =$$

C. Change the following into fractions.

1.  $0.8 =$

2.  $-0.12 =$

3.  $0.\bar{6} =$

4.  $2.4 =$

5.  $-3.\overline{25} =$

6.  $-9.64 =$

7.  $-6.\overline{12} =$

8.  $10.05 =$

9.  $15.48 =$

10.  $-7.125 =$

## Answers

### Simplifying Rational Numbers

- 1)  $-\frac{3}{4}$     2)  $-\frac{1}{2}$     3)  $\frac{5}{7}$     4)  $\frac{3}{5}$     5)  $\frac{9}{16}$   
6)  $-\frac{2}{3}$     7)  $\frac{3}{4}$     8)  $-\frac{5}{8}$     9)  $\frac{8}{3}$     10)  $-\frac{1}{13}$

Change the following to Improper Fractions.

- 1)  $\frac{13}{5}$     2)  $-\frac{25}{8}$     3)  $-\frac{5}{4}$     4)  $\frac{13}{2}$     5)  $-\frac{14}{3}$   
6)  $\frac{41}{4}$     7)  $-\frac{39}{5}$     8)  $-\frac{69}{7}$     9)  $\frac{58}{11}$     10)  $\frac{65}{8}$

Change the following to Mixed Numbers.

- 1)  $-3\frac{1}{3}$     2)  $3\frac{3}{4}$     3)  $4\frac{1}{2}$     4)  $-2\frac{2}{5}$     5)  $-2\frac{5}{8}$   
6)  $5\frac{1}{7}$     7)  $-2\frac{1}{4}$     8)  $-8\frac{4}{7}$     9)  $4\frac{1}{6}$     10)  $-4\frac{11}{12}$

Change the following into fractions.

- 1)  $\frac{4}{5}$     2)  $-\frac{3}{25}$     3)  $\frac{2}{3}$     4)  $2\frac{2}{5}$     5)  $-3\frac{25}{99}$   
6)  $-9\frac{16}{25}$     7)  $-6\frac{4}{33}$     8)  $10\frac{1}{20}$     9)  $15\frac{12}{25}$     10)  $-7\frac{1}{8}$