

**Section 3.2: Adding
Rational Numbers**

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Review of Adding Integers

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When adding integers, apply the following sign rules:

1. If the signs are the same, add the numbers, keeping the sign of the original numbers.

A. $(-3) + (-4) = (-7)$

B. $2 + 8 = 10$

2. If the signs are different, ignore the signs. Subtract the smaller number from the larger number (the sign in the answer will be the same as the sign of the larger number).

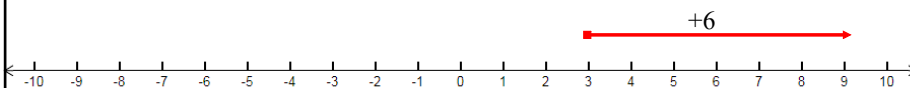
A. $(-9) + 4 = (-5)$

B. $7 + (-6) = 1$

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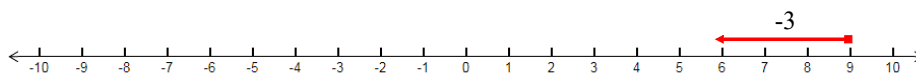
To add integers using a number line, start at the first integer:

1. Move to the right when adding a positive integer.



Addition Statement: $3 + 6 = 9$

2. Move to the left when adding a negative integer.



Addition Statement: $9 + (-3) = 6$

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Adding Rational Numbers in Decimal Form

When adding decimal numbers, the same rules apply as for integers.

A. $4.2 + 6.9 = 11.1$

B. $(-5.1) + (-10.8) = (-15.9)$

C. $3.8 + (-1.1) = 2.7$

D. $4.8 + (-19.2) = (-14.4)$

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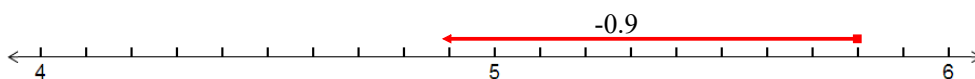
When adding decimals using a number line, the same rules apply as for integers.

A.



Addition Statement: $2.2 + 1.6 = 3.8$

B.



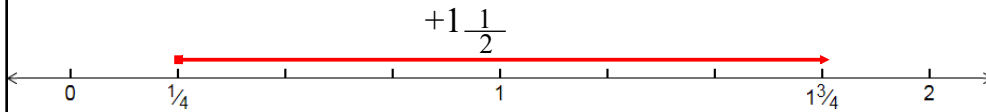
Addition Statement: $5.8 + (-0.9) = 4.9$

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Adding Rational Numbers in Fraction Form

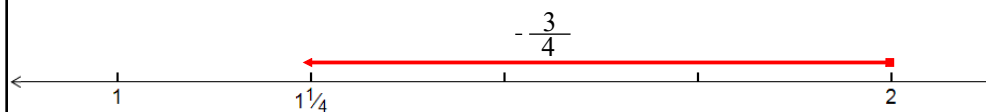
When adding fractions using a number line, the same rules apply as for integers.

A.



Addition Statement: $\frac{1}{4} + \frac{11}{2} = \frac{31}{4}$

B.



Addition Statement: $2 + \left(-\frac{3}{4}\right) = 1\frac{1}{4}$

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To add fractions:

1. Change mixed number to an improper fraction (if need be).
2. Find a common denominator (if need be).
3. Replace each fraction with an equivalent fraction that has the common denominator.
4. Add the numerators and keep the common denominator the same.

A. $\frac{-7}{9} + \frac{5}{9} = \frac{-2}{9}$

B. $\frac{-7}{8} + \frac{3}{4}$ LCD = 8

$$= \frac{-7}{8} + \frac{3}{4} \times \frac{2}{2}$$

$$= \frac{-7}{8} + \frac{6}{8}$$

$$= \frac{-1}{8}$$

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$$C. \frac{3}{8} + \frac{7}{6} \quad \text{LCD} = 24$$

$$= \frac{3}{8} \times \frac{3}{3} + \frac{7}{6} \times \frac{4}{4}$$

$$= \frac{9}{24} + \frac{28}{24}$$

$$= \frac{37}{24}$$

$$= 1 \frac{13}{24}$$

$$D. -3\frac{1}{3} + 2\frac{5}{6} \quad \text{LCD} = 6$$

$$= -\frac{10}{3} + \frac{17}{6}$$

$$= -\frac{10}{3} \times \frac{2}{2} + \frac{17}{6}$$

$$= -\frac{20}{6} + \frac{17}{6}$$

$$= -\frac{3}{6} \begin{matrix} +3 \\ -3 \end{matrix}$$

$$= -\frac{1}{2}$$

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Word Problems (Decimals and Fractions)

1. A guardrail needs to be exactly 19.77 m long. A contractor has 3 pieces measuring 2.21m, 9.14m and 3.21m, does he have enough to complete the guardrail?

$$2.21\text{m} + 9.14\text{m} + 3.21\text{m} = 14.56 \text{ m}$$

The contractor does not have enough to complete the guardrail.

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2. Peter estimates that it takes him $\frac{1}{4}h$ to prepare the dough, $\frac{1}{10}h$ to grate the cheese, $\frac{1}{3}h$ to prepare the toppings, and $\frac{2}{5}h$ to bake the pizza.

A. What fraction of time did it take Peter in total to prepare the pizza?

We need to find the sum of the fractions:

$$\frac{1}{4} + \frac{1}{10} + \frac{1}{3} + \frac{2}{5}$$

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Using 60 as the common denominator:

$$\frac{1}{4} + \frac{1}{10} + \frac{1}{3} + \frac{2}{5}$$

$$= \frac{1}{4} \times \frac{15}{15} + \frac{1}{10} \times \frac{6}{6} + \frac{1}{3} \times \frac{20}{20} + \frac{2}{5} \times \frac{12}{12}$$

$$= \frac{15}{60} + \frac{6}{60} + \frac{20}{60} + \frac{24}{60}$$

$$= \frac{65}{60}$$

$$= 1 \frac{5}{60}$$

$$= 1 \frac{1}{12}$$

It will take Peter $1\frac{1}{12}$ of an hour to prepare the pizza.

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3. Susan borrowed \$52.35 from her parents for a new sweater. She earns \$22.50 for a night of baby-sitting and gives this to her parents.

A. Write an addition statement to represent this situation.

We represent a debt by using a negative number.

$$-52.35 + 22.50 = -29.85$$

B. How much does Susan now owe?

Susan now owes \$29.85.

Practice Exercises: Pgs. 111-113
#3, 4, 5, 7, 11,13, 14, 15ab, 17bc, 18

Extra: Pg 113 # 20, 22

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