

# Solving Two-Step Equations with Rational Numbers

Grade 7 math · Worksheet · Standards: 7.EE.B.3, 7.EE.B.4a

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Class: \_\_\_\_\_

These problems train standards 7.EE.B.3 and 7.EE.B.4a: solving equations of the forms  $px + q = r$  and  $p(x + q) = r$  with rational numbers. Early problems use whole numbers, then decimals, fractions and negatives appear.

Write each step on its own line and name the operation you undo. Later problems ask for an estimate, a comparison of methods, and equations built from fees, rates and formulas.

**Standards:** 7.EE.B.3, 7.EE.B.4a · **Level:** Grade 7

## Problem 1 Add, Then Multiply (easy)

Solve  $3x + 5 = 29$ .

## Problem 2 Subtract, Then Multiply (easy)

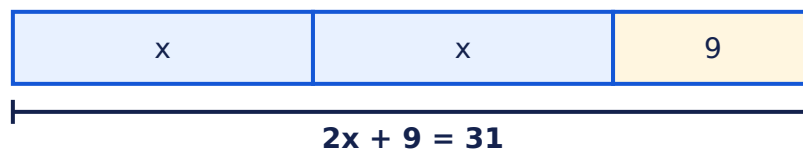
Solve  $5x - 4 = 31$ .

## Problem 3 A Quotient Plus a Constant (easy)

Solve  $\frac{x}{4} + 3 = 9$ .

## Problem 4 Read the Tape Diagram (easy)

The tape diagram shows  $2x + 9 = 31$ . Find  $x$ .



*Two equal parts and a 9 make 31.*

**Problem 5 A Negative Coefficient** (medium)

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Solve  $-4x + 6 = 30$ .

**Problem 6 Decimal Coefficient** (medium)

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Solve  $2.5x - 3.5 = 11.5$ .

**Problem 7 Fraction Coefficient** (medium)

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Solve  $\frac{7}{8}x + 5 = 19$ .

**Problem 8 Two Ways with Parentheses** (medium)

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Solve  $4(x + 3) = 36$  two ways: dividing first, and distributing first.

**Problem 9 Negative Factor Outside** (medium)

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Solve  $-2(x - 5) = 18$ .

**Problem 10 Decimal Factor Outside** (medium)

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Solve  $0.4(x - 3) = 2.8$ .

**Problem 11 Negative Quotient** (medium)

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Solve  $-\frac{x}{3} - 4 = 2$ .

**Problem 12 Variable on the Right** (medium)

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Solve  $2.6 + 1.3x = -5.2$ .

**Problem 13 Fractions Inside and Out** (hard)

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Solve  $\frac{2}{3}(x + \frac{3}{4}) = \frac{5}{2}$ .

**Problem 14 Arithmetic and Algebra** (hard)

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A number is multiplied by 6 and then 3.5 is subtracted, giving 20.5. Find the number by working

backward with arithmetic, then by solving  $6x - 3.5 = 20.5$ .



*The operations applied to the number.*

### Problem 15 Summer Camp Cost (medium)

A summer camp charges a \$60 registration fee plus \$85 per week. Karim's family paid \$485 in total. Write an equation, estimate the number of weeks, and solve it.

| Weeks          | 1   | 2   | 3   | 4   |
|----------------|-----|-----|-----|-----|
| Cost (dollars) | 145 | 230 | 315 | 400 |

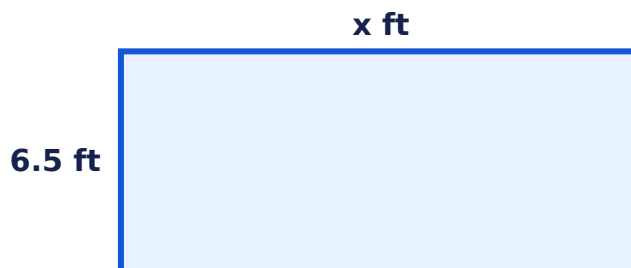
*Cost for the first four weeks.*

### Problem 16 Hours at the Food Truck (medium)

Ravi earns \$9.75 per hour plus \$30 in tips on Saturday. He earned \$108 in all. How many hours did he work?

### Problem 17 Fencing a Rectangle (medium)

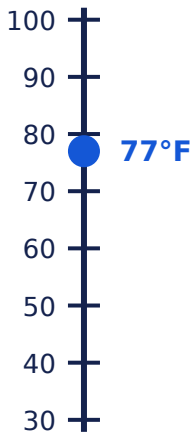
A rectangular pen is  $x$  feet long and 6.5 feet wide. Its perimeter is 31 feet. Write and solve an equation for  $x$ .



*Pen with perimeter 31 ft.*

### Problem 18 Fahrenheit and Celsius (hard)

A science lab converts temperatures with  $F = 1.8C + 32$ . A thermometer reads  $77^{\circ}\text{F}$ . Find the Celsius temperature  $C$ .



*Reading of 77°F.*

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**Problem 19 Group Tickets with a Fee** (hard)

A school buys 6 tickets. Each ticket costs  $t$  dollars plus a \$2.50 booking fee, and the total is \$87. Estimate  $t$ , then write and solve an equation to find it.

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**Problem 20 Descending the Trail** (hard)

A hiker starts at an elevation of 1,240 feet and descends 36 feet each minute. After  $m$  minutes the elevation is 340 feet. Write and solve an equation, and state what the answer means.