MATHEMATICS · GRADES 7-9

Equations with fractions

Difficulty level: Intermediate

Mathematics: Grades 7-9

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Overview of the concept

This is how you solve for an unknown when fractions are in the way. Scaling a recipe up or down to feed the people at your table means fractions on both sides of the equation. Clearing them first turns the problem into plain whole numbers you can solve. It is how you get an exact answer in the kitchen instead of guessing and hoping the recipe still works.



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Worked examples

EXAMPLE 1

Q Solve $\frac{x}{3} + 2 = 6$.

SOLUTION

This is an equation with a fraction in it, so clear the fraction first: multiply every term by the denominator, 3.

That gives $x + 6 = 18$

Take 6 off both sides: $x = 12$

EXAMPLE 2

Q Solve $\frac{2x}{5} = 6$.

SOLUTION

Again, clear the fraction first: multiply both sides by 5.

That gives $2x = 30$

Divide by 2: $x = 15$

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Practice questions

1 Solve $\frac{x}{4} + 1 = 6$

- **A** x = 5
- **B** x = 10
- **C** x = 20
- **D** x = 24

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2 Solve $\frac{3x}{4} = 9$

- **A** x = 3
- **B** x = 9
- **C** x = 12
- **D** x = 16

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3 Solve $\frac{x+2}{3} = 5$

- **A** x = 11
- **B** x = 13
- **C** x = 15
- **D** x = 17

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

- **A** x = 5
- **B** x = 6
- **C** x = 10
- **D** x = 12

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5 Solve $\frac{2x}{5} + 1 = 5$

- **A** x = 8
- **B** x = 10
- **C** x = 12
- **D** x = 15

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6 Solve $\frac{x}{4} - \frac{x}{8} = 1$

- **A** x = 4
- **B** x = 8
- **C** x = 16
- **D** x = 2

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7 Half of a number is 9. What is the number?

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8 Sara shares a bag of marbles equally among 4 friends, then adds 1 marble to one share, and that share is now 6 marbles. How many marbles were in the bag at first?

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9 The solution is $x = 12$. Which equation has this solution?

A $\frac{x}{3} = 3$

B $\frac{2x}{3} = 6$

C $\frac{x}{4} + 1 = 4$

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10 Ben solves $\frac{x}{3} = 7$ by writing $x = \frac{7}{3}$. What is his mistake?

A. He multiplied instead of dividing; $x = \frac{7}{3}$

B. He divided instead of multiplying; $x = 21$

C. He added 3 instead of multiplying; $x = 10$

D. He divided correctly; $x = \frac{7}{3}$

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ANSWER KEY

1. $x = 20$

2. $x = 12$

3. $x = 13$

4. $x = 6$

5. $x = 10$

6. $x = 8$

7. 18

8. 20

9. $\frac{x}{4} + 1 = 4$

10. He divided instead of multiplying; $x = 21$

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