Unknown Numbers in Equations

When an equation has a question mark or a box, ask: "What operation makes the equation true?" Then *undo* that operation on the other side to find the unknown.

If the equation is ...	Undo with ...
$? + a = b$	subtraction: $? = b - a$
$? - a = b$	addition: $? = b + a$
$? \times a = b$	division: $? = b \div a$
$? \div a = b$	multiplication: $? = b \times a$

Key Concepts

1. An equation with an unknown asks: "What number makes this true?"

2. To find the unknown, do the *opposite* of what's happening to it. Addition undoes subtraction. Multiplication undoes division.

3. Always **check** by plugging your answer back into the original equation.

4. The unknown can be on the left or the right of the equals sign — the strategy is the same.

Worked Examples

① Solve: $? + 14 = 30$.

The unknown plus 14 equals 30. Undo the "+14" by subtracting 14 from 30: $? = 30 - 14 = 16$. Check: $16 + 14 = 30$ ✓.

Answer: 16

② Solve: $? - 9 = 27$.

The unknown minus 9 equals 27. Undo the "−9" by adding 9 to 27: $? = 27 + 9 = 36$. Check: $36 - 9 = 27$ ✓.

Answer: 36

③ Solve: $? \times 6 = 42$.

The unknown times 6 equals 42. Undo the "×6" by dividing 42 by 6: $? = 42 \div 6 = 7$. Check: $7 \times 6 = 42$ ✓.

Answer: 7

Practice Problems

Find the unknown number.

1. $? + 8 = 25$ _____

2. $? - 15 = 34$ _____

3. $? \times 5 = 35$ _____

4. $? \div 4 = 9$ _____

5. $17+? = 50$ _____

6. $? - 22 = 48$ _____

7. $? \times 8 = 56$ _____

8. $? \div 7 = 6$ _____

9. $? + 36 = 81$ _____

10. $? - 19 = 41$ _____

11. $? \times 9 = 63$ _____

12. $? \div 3 = 8$ _____

Study Tips

- Each operation has an opposite. Memorize the pairs: $+$ undoes $-$; $\times$ undoes $\div$.
- Always plug your answer back into the original equation. If it works, you're done.
- For "$? \div a = b$" the trick is to *multiply* both sides by a. The unknown turns out to be $a \times b$.

Word Problems

1. Jake had some baseball cards. He gave away 12 and now has 35. How many did he start with? Write an equation.

Answer: _____

2. A baker puts muffins into bags of 6. She fills ? bags and uses 54 muffins in all. How many bags?

Answer: _____

Answer Key — with Friendly Explanations

Practice Problems

1. Undo addition: $25 - 8 = 17$.

Answer: 17

2. Undo subtraction: $34 + 15 = 49$.

Answer: 49

3. Undo multiplication: $35 \div 5 = 7$.

Answer: 7

4. Undo division: $9 \times 4 = 36$.

Answer: 36

5. Undo addition: $50 - 17 = 33$.

Answer: 33

6. Undo subtraction: $48 + 22 = 70$.

Answer: 70

7. Undo multiplication: $56 \div 8 = 7$.

Answer: 7

8. Undo division: $6 \times 7 = 42$.

Answer: 42

9. Undo addition: $81 - 36 = 45$.

Answer: 45

10. Undo subtraction: $41 + 19 = 60$.

Answer: 60

11. Undo multiplication: $63 \div 9 = 7$.

Answer: 7

12. Undo division: $8 \times 3 = 24$.

Answer: 24

Word Problems

1. $? - 12 = 35 \Rightarrow ? = 47$.

Answer: 47 *cards*

2. $? \times 6 = 54 \Rightarrow ? = 9$.

Answer: 9 *bags*

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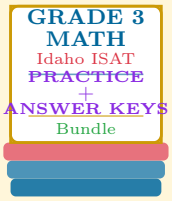

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