

## Homework without the hassle

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## Find the Hidden Number - Year 3

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| Table of Contents (continued)      |                                                                                     |
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# Before you teach

Teaching question: How can the whole and known part reveal an unknown in any equation position?

Five lessons of 45–60 minutes. Equipment: counters, tiles, part–whole mats or hundred grids, pencils, and the model and game cards in this pack.

Prior knowledge: addition and subtraction, part–part–whole thinking, and place value. Begin with  $27 + ? = 64$  and  $? - 27 = 37$  without answers. Record who identifies the whole before calculating.

Success: the student finds mixed unknowns, shows a suitable model or verbal reason, and checks a fresh result. A memorised keyword *keep the whole* is insufficient.

Vocabulary: inverse, part, whole, unknown, equation, check, keep the whole and units fixed when moving between model and equation.

Access: offer counters and a pre-partitioned model for support; ask core learners for independent mixed examples, extend with a checked counterexample. Reduce incidental writing without reducing reasoning.

Model card key: 1=37; 2=37; 3=64; 4=35; 5=45; 6=42; 7=60; 8=32; 9=34; 10=67; 11=no non-negative solution; 12=0

# Lessons 1-3

Lesson 1 — Identify the whole and known part. Display R1. Think aloud: in  $27 + ? = 64$ , 64 is the whole and 27 is a known part. Contrast  $? - 27 = 37$ , where the whole is unknown. Partners classify R2 cards 2–3. Ask every learner to name a whole and part before moving on.

Lesson 2 — Solve missing addends. Model  $64 - 27 = 37$  with a split whole and place-value partitioning. Complete R3 guided page, then ask learners to explain how the position changes in  $? + 18 = 50$ . Check that they substitute the answer in the original equation.

Lesson 3 — Solve unknown subtrahends and minuends. Demonstrate a complete R4 turn using  $83 - ? = 41$ . Deliberately test a wrong response, then correct it with  $41 + 42 = 83$ . Students complete R3 next page and play all 12 R4 cards. Listen for explanations, not just number answers.

Across lessons: use the specific insecure prerequisite revealed by the entry prompts. Do not reteach the entire companion fact family unit. Never suggest that subtraction can swap order.

PREVIEW

# Lessons 4-5 and marking

Lesson 4 — Compare a model and equation. Use R5 rehearsal 1:  $39 + ? = 84$  and  $84 - ? = 39$  share a whole and known part. Repair  $84 - 39 = 55$  with  $84 - 39 = 45$  and a check. Rehearsal 2 compares a missing whole with a missing part. Give one precise correction and ask for a new application.

Lesson 5 — Retrieve the success criteria, then set R6 independently. Accept a drawing or verbal explanation of the part-whole relation. Apply R7 to actual evidence. Record one next teaching step for the student; do not convert the descriptors to a percentage or grade.

Game challenge key: 1=37; 2=47; 3=45; 4=71; 5=48; 6=63; 7=26; 8=17; 9=45; 10=73; 11=43; 12=82. Ask for an inverse check before awarding a card.

Assessment key:  $36 + ? = 71$  gives 35;  $86 - ? = 49$  gives 37;  $14 + ? = 38$  gives 24. For the last, whole 62 has parts 24 and 38;  $62 - 24 = 38$  is a check. Accept another mathematically sound model or explanation.

Look for: correct results, a model or reason tied to the whole and parts, and transfer to a fresh unknown position. Address guesses and reversed-subtraction claims with a concrete counterexample.

# Find the hidden number

| Whole<br>64 |   |
|-------------|---|
| 27          | ? |

$$27 + ? = 64$$

$$? - 27 = 37$$

Find the whole and the known part first.

$$27 - ? = 64$$

No non-negative part works here.

1

$$27 + ? = 64$$

Whole: 64



What is unknown?

The missing part.

$$? = 37$$

Check:

$$27 + 37 = 64$$

2

$$64 - ? = 27$$

Whole: 64



What is unknown?

The missing part.

3

$$? - 27 = 37$$

Whole: ?



What is unknown?

The whole (total).

# Find the Hidden Number: **model cards**

**4**

$$18 + ? = 53$$

Label the whole and the two parts.

|  |  |
|--|--|
|  |  |
|  |  |

**5**

$$? + 26 = 71$$

Label the whole and the two parts.

|  |  |
|--|--|
|  |  |
|  |  |

**6**

$$83 - ? = 41$$

Label the whole and the two parts.

|  |  |
|--|--|
|  |  |
|  |  |

# Find the Hidden Number: model cards



7

$$? - 24 = 36$$

Label the whole and the two parts.

|  |  |
|--|--|
|  |  |
|  |  |



8

$$90 - ? = 58$$

Label the whole and the two parts.

|  |  |
|--|--|
|  |  |
|  |  |



9

$$38 + ? = 72$$

Label the whole and the two parts.

|  |  |
|--|--|
|  |  |
|  |  |

PREVIEW

# Find the Hidden Number: model cards

10

$$? - 19 = 48$$

Label the whole and the two parts.

|  |  |
|--|--|
|  |  |
|  |  |

11

$$27 - ? = 64$$

Label the whole and the two parts.  
Can a non-negative number work?  
Explain.

|  |  |
|--|--|
|  |  |
|  |  |

12

$$44 + ? = 44$$

Label the whole and the two parts.

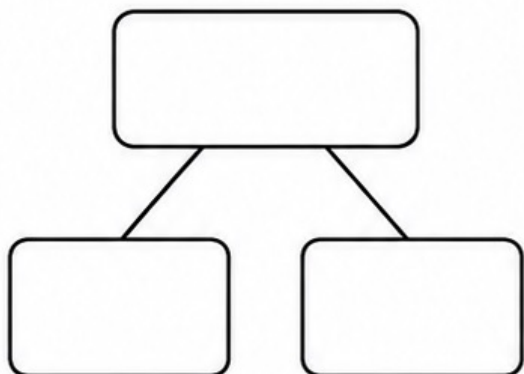
|  |  |
|--|--|
|  |  |
|  |  |

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

## Missing-number practice 1: guided

For each equation, label the whole and known part. Find the unknown and check it.

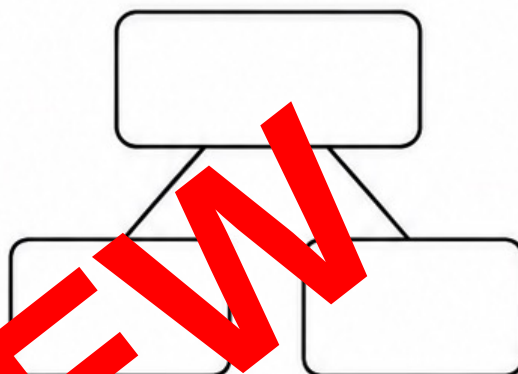
1.  $27 + ? = 64$



Inverse: \_\_\_\_\_

Check: \_\_\_\_\_

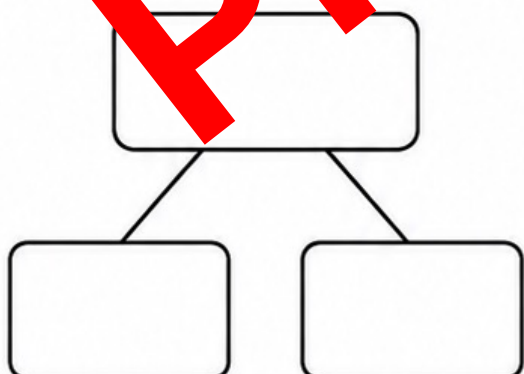
2.  $? + 18 = 50$



Inverse: \_\_\_\_\_

Check: \_\_\_\_\_

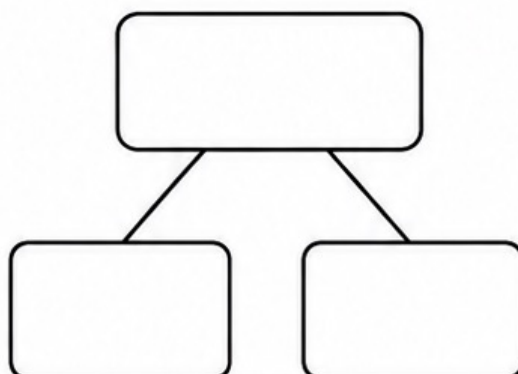
3.  $72 - ? = 36$



Inverse: \_\_\_\_\_

Check: \_\_\_\_\_

4.  $? - 25 = 34$



Inverse: \_\_\_\_\_

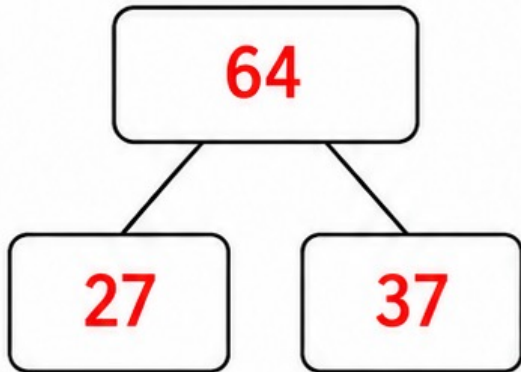
Check: \_\_\_\_\_

Name: **ANSWERS**

## Missing-number practice 1: guided

For each equation, label the whole and known part. Find the unknown and check it.

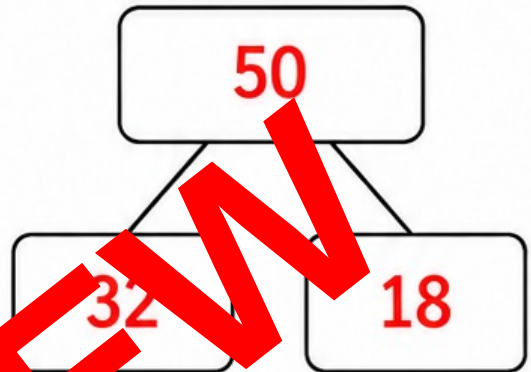
1.  $27 + ? = 64$



Inverse:  $64 - 27 = 37$

Check:  $27 + 37 = 64$

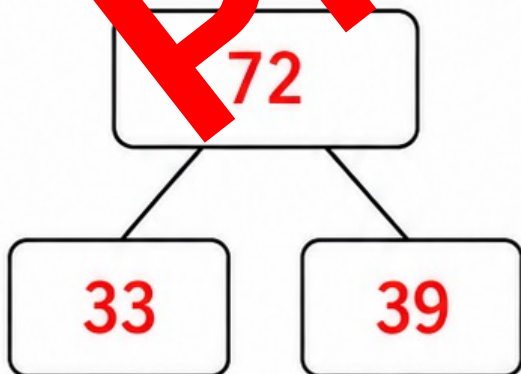
2.  $? + 18 = 50$



Inverse:  $50 - 18 = 32$

Check:  $32 + 18 = 50$

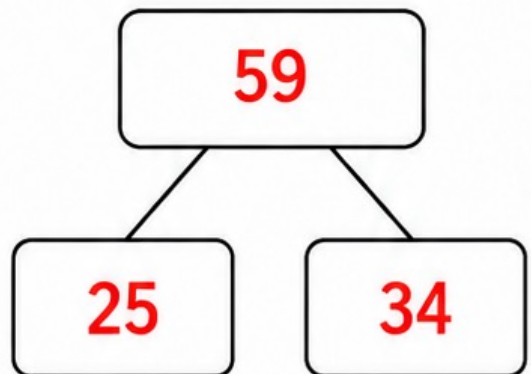
3.  $72 - ? = 39$



Inverse:  $72 - 39 = 33$

Check:  $72 - 33 = 39$

4.  $? - 25 = 34$



Inverse:  $25 + 34 = 59$

Check:  $59 - 25 = 34$

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

## Missing-number practice 2: mixed positions

Solve each. Show a model or inverse check for at least two.

1.  $45 + ? = 81$

Answer: \_\_\_\_\_

2.  $? + 29 = 73$

Answer: \_\_\_\_\_

3.  $68 - ? = 24$

Answer: \_\_\_\_\_

4.  $? - 38 = 27$

Answer: \_\_\_\_\_

5.  $90 - ? = 47$

Answer: \_\_\_\_\_

6.  $? - 16 = 58$

Answer: \_\_\_\_\_

My model or inverse checks:

Name: **ANSWERS**

## Missing-number practice 2: mixed positions

Solve each. Show a model or inverse check for at least two.

1.  $45 + ? = 81$

Answer: 36

2.  $? + 29 = 73$

Answer: 44

3.  $68 - ? = 24$

Answer: 44

4.  $? - 38 = 27$

Answer: 65

5.  $90 - ? = 47$

Answer: 43

6.  $? - 16 = 58$

Answer: 74

My model or inverse checks:

$81 - 45 = 36$

$38 + 27 = 65$

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

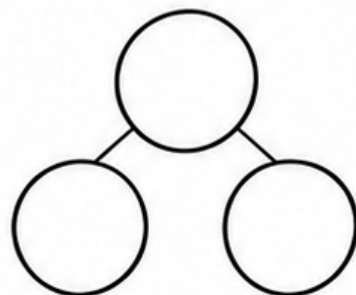
## Missing-number practice 3: explain your choice

For each equation, show how the whole and known part tell you what to do.

1.  $47 + ? = 82$

Unknown = \_\_\_\_\_

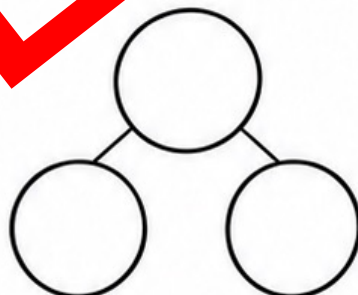
My reason:



2.  $? - 36 = 28$

Unknown = \_\_\_\_\_

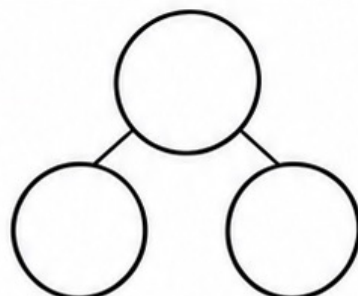
My reason:



3.  $75 - ? = 49$

Unknown = \_\_\_\_\_

My reason:



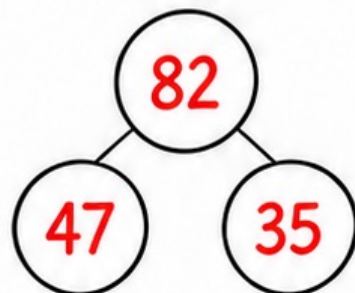
Name: ANSWERS

## Missing-number practice 3: explain your choice

For each equation, show how the whole and known part tell you what to do.

1.  $47 + ? = 82$

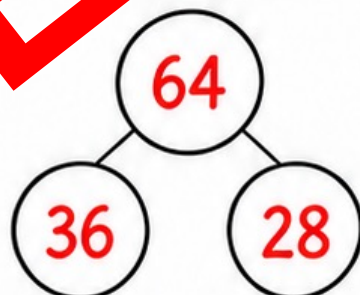
Unknown = 35



My reason: 82 is the whole.  $82 - 47 = 35$ .

2.  $? - 36 = 28$

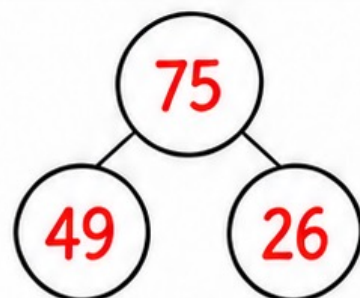
Unknown = 64



My reason: The whole is missing.  $36 + 28 = 64$ .

3.  $75 - ? = 49$

Unknown = 26



My reason: 75 is the whole.  $75 - 49 = 26$ .

# Find the Unknown:

## > partner game <



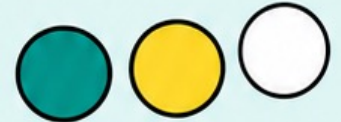
### You need:



12 challenge cards



pencils



optional counters

### How to play:

- 1 Take a card.
- 2 Name the whole and known part.
- 3 Find the unknown.
- 4 Check with the inverse and explain to your partner.
- 5 Keep the card when your reasoning checks out.

### Finish:

Play all 12 cards. The player with more checked cards wins.



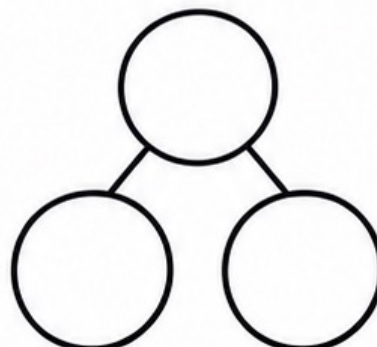
### Example turn:

$$83 - ? = 41$$

$$83 - 41 = 42$$

$$\text{Check: } 41 + 42 = 83.$$

### Part-whole model:



Use a part-whole model to help you think.

**Find the Unknown:**  
challenge card 1

$$56 + ? = 93$$

Show an inverse check.

**Find the Unknown:**  
challenge card 2

$$? + 35 = 82$$

Show an inverse check.

**Find the Unknown:**  
challenge card 3

$$74 - ? = 29$$

Show an inverse check.

**Find the Unknown:**  
challenge card 4

$$? - 23 = 48$$

Show an inverse check.

**Find the Unknown:**  
challenge card 5

$$85 - ? = 37$$

Show an inverse check.

**Find the Unknown:**  
challenge card 6

$$? - 19 = 44$$

Show an inverse check.

**PREVIEW**



# Find the Unknown: challenge cards 7–12



7

$$32 + ? = 68$$

Show an inverse check.

8

$$? + 27 = 64$$

Show an inverse check.

9

$$96 - ? = 51$$

Show an inverse check.

10

$$? - 34 = 39$$

Show an inverse check.

11

$$71 - ? = 28$$

Show an inverse check.

12

$$? - 25 = 57$$

Show an inverse check.

PREVIEW

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

## Rehearsal 1: same whole, different equation

Solve both. Draw one part-whole model. Explain what stays the same.

$$39 + ? = 84$$

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$$84 - ? = 39$$

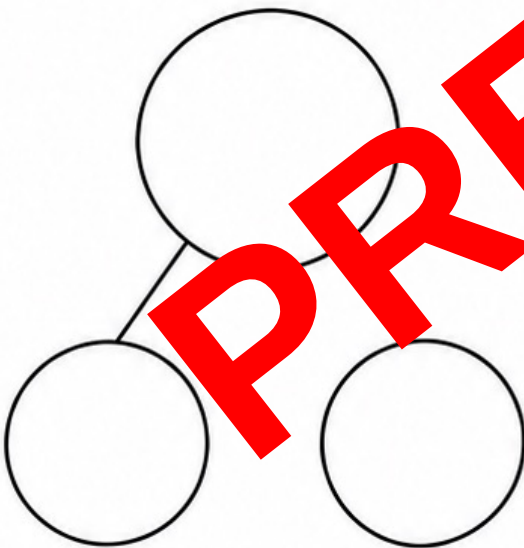
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Part-whole model:



Unknowns

---

---

---

My explanation:

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---

A learner says  $84 - 39 = 55$ . Explain and repair the error.

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Name: **ANSWERS**

## Rehearsal 1: same whole, different equation

Solve both. Draw one part-whole model. Explain what stays the same.

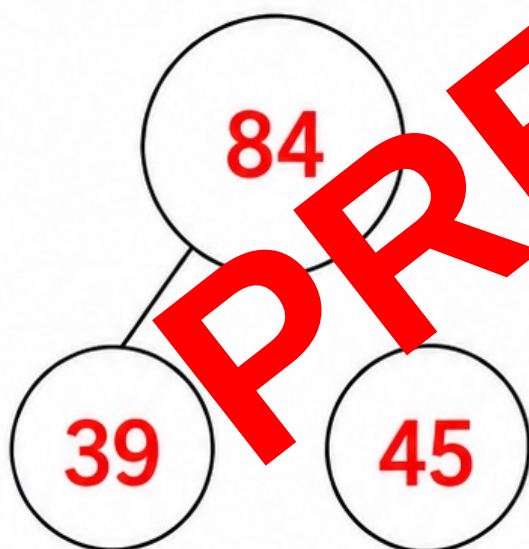
$$39 + ? = 84$$

**45**

$$84 - ? = 39$$

**45**

Part-whole model:



Unknowns

**45**

My explanation:

**Both show the same whole 84 and known part 39. The missing part is 45.**

A learner says  $84 - 39 = 55$ . Explain and repair the error.

**$84 - 39 = 45$ , not 55. Check:  $39 + 45 = 84$ .**

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

## Rehearsal 2: whole or part?

Solve both. Which unknown is the whole? Which is a part?

$$? - 28 = 46$$

Model:



Unknowns:

---

---

My explanation:

---

---

---

---

$$74 - ? = 46$$

Model:



Unknowns:

---

---

My explanation:

---

---

---

---

A learner says  $46 - 28 = 74$ . Explain and repair the error.

---

---

---

---

Name: **ANSWERS**

## Rehearsal 2: whole or part?

Solve both. Which unknown is the whole? Which is a part?

$$? - 28 = 46$$

Model:

|    |    |
|----|----|
| 74 |    |
| 28 | 46 |

Unknowns:

**74 (the whole)**

My explanation:

**$28 + 46 = 74$**

$$74 - ? = 46$$

Model:

|    |    |
|----|----|
| 74 |    |
| 28 | 46 |

Unknowns:

**28 (a part)**

My explanation:

**$74 - 46 = 28$**

A learner says  $46 - 28 = 74$ . Explain and repair the error.

**$46 - 28 = 18$ , not 74. To find the whole, add:**

**$46 + 28 = 74$ .**

# Find the Hidden Number: assessment

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

Work on your own. Find each unknown. Show a model or explain your choice, then check one result.

1.  $36 + ? = 71$

\_\_\_\_\_

2.  $86 - ? = 49$

\_\_\_\_\_

3.  $? - 24 = 38$

\_\_\_\_\_

My model for item \_\_\_\_\_



My reason:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

My inverse check:

\_\_\_\_\_  
\_\_\_\_\_

# Find the Hidden Number: assessment

Name: ANSWERS

Work on your own. Find each unknown. Show a model or explain your choice, then check one result.

1.  $36 + ? = 71$

35

2.  $86 - ? = 49$

37

3.  $? - 24 = 38$

62

My model for item 3



My reason:

24 and 38 are parts, so the whole is 62.

My inverse check:

$62 - 24 = 38.$

Look for correct results, a valid model or reason, and an inverse check. Accept equivalent explanations.

# Find the Hidden Number: learning evidence

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

Date: \_\_\_\_\_

|                          | Needs teaching                | Developing with support             | Target met independently              |
|--------------------------|-------------------------------|-------------------------------------|---------------------------------------|
| Concept / accuracy       | Inaccurate whole/part model.  | Correct familiar model with prompt. | Correct fresh unknown position.       |
| Application / procedure  | Cannot yet solve.             | Solves with step prompts.           | Solves mixed positions independently. |
| Reason / evidence        | Guess or rule label only.     | Relevant model with prompting.      | Specific model or inverse reason.     |
| Transfer / communication | Unclear or no fresh transfer. | Clear with support.                 | Clear explanation in a fresh case.    |

Evidence observed

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Next step:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Find the Hidden Number



# Our goal

Find an unknown in any position.

Show the whole and the parts, then check.

Try first:  $27 + ? = 64$  and  $? - 27 = 37$



# Words that help us think

Whole: the total. Part: an amount in the whole.

Unknown: the missing value. Equation: equal values.

Inverse: an operation that undoes another.

Check: substituting our result in the first equation.



# One whole, two parts

Whole 64; one part 27; the other part is unknown

$$27 + ? = 64$$

Which number is the whole? Which part do we know?



# Find a missing part

$64 - 27 = 37$ , so  $27 + 37 = 64$ .

Partition to check:  $64 - 20 = 44$ ,  $44 - 7 = 37$ .

The missing part is 37.



# A different unknown position

$? - 27 = 37$  asks for the whole:  $27 + 37 = 64$

Contrast:  $27 - ? = 64$  has no negative part.

Order matters in subtraction



# Your turn: identify first

$$18 + ? = 53$$

Name the whole and known parts

Which inverse calculation will find the missing part?



# Guided answer and check

The whole is 53 and the known part is 18.

$$53 - 18 = 35.$$

Check:  $18 + 35 = 53.$



**The missing addend can move**

$$? + 26 = 71$$

$$71 - 26 = 45.$$

$$\text{Check: } 45 + 26 = 71.$$



# A complete game turn

Card:  $83 - ? = 41$ .

Whole 83; known remaining part 41.

Missing part 42 because  $83 - 41 = 42$ .

Check:  $41 + 42 = 83$ . Explain before keeping the card.



# Partner challenge

$$? - 24 = 36$$

Build or draw a part-whole model.

Find the whole and explain an inverse check.



# Repair this misconception

$$64 - 27 = 37.$$

A learner reverses it:  $27 - 64 = 37$ .

That is false. Subtraction does not swap around.

Use the whole and parts to restore the correct order.



# Compare two equations

$$39 + ? = 84 \quad \text{and} \quad 84 - ? = 39$$

The whole and known part stay the same.

Both unknowns are 45. Check  $39 + 45 = 84$ .



# Choose a helpful route

Support: use counters and a split whole.

Core: solve mixed unknown problems and explain.

Extension: write a false claim and repair it.

All routes use the same whole-part reasoning.



# Independent assessment

Solve each mixed-position equation on your own.

Label a whole and its parts.

Explain your choice and check one result.

A memorised key word rule is not enough.



# Reflect on your method

Which unknown position was hardest?

Which model or check made it clearer?

What will you try next time?



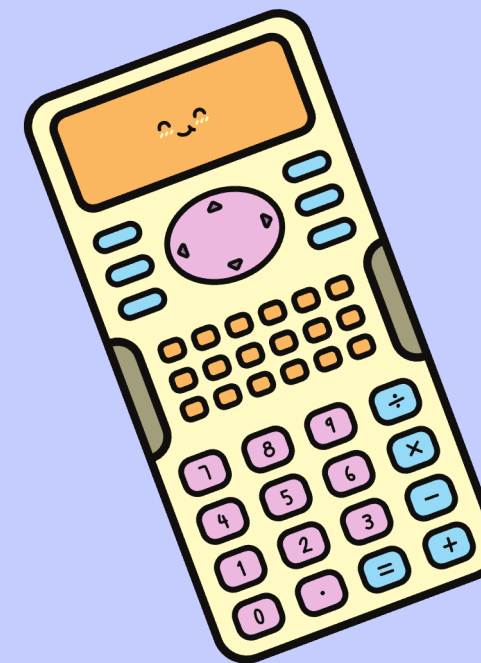
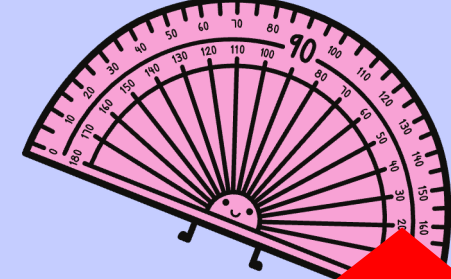
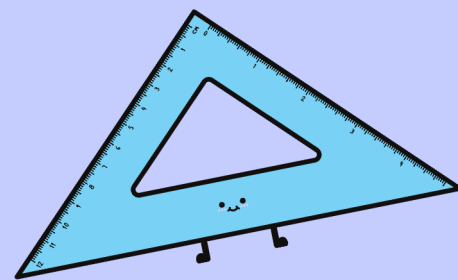
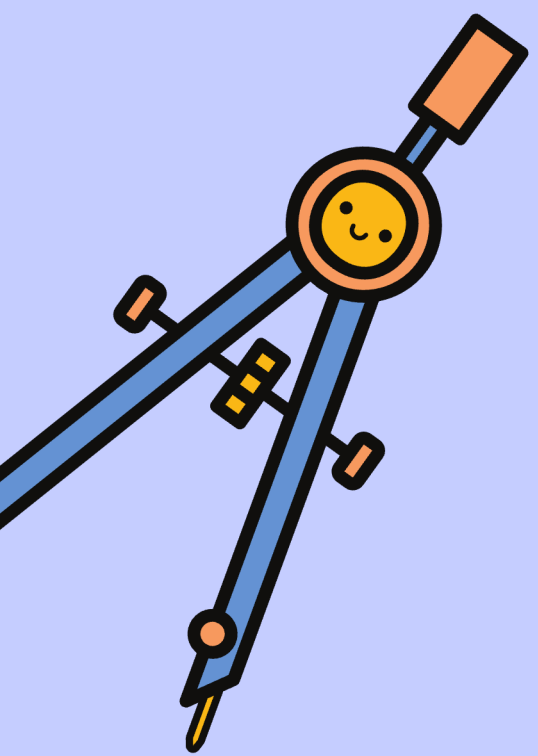
# The useful decision

If the whole is known, subtract the known parts.

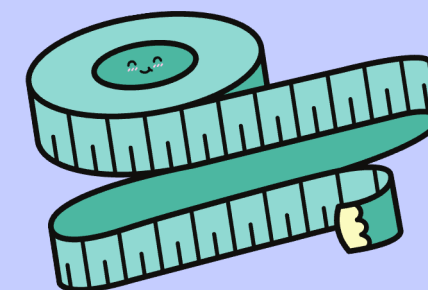
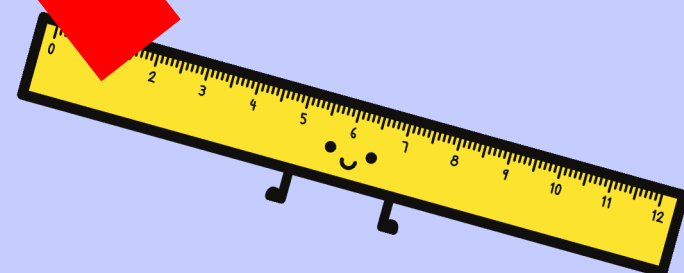
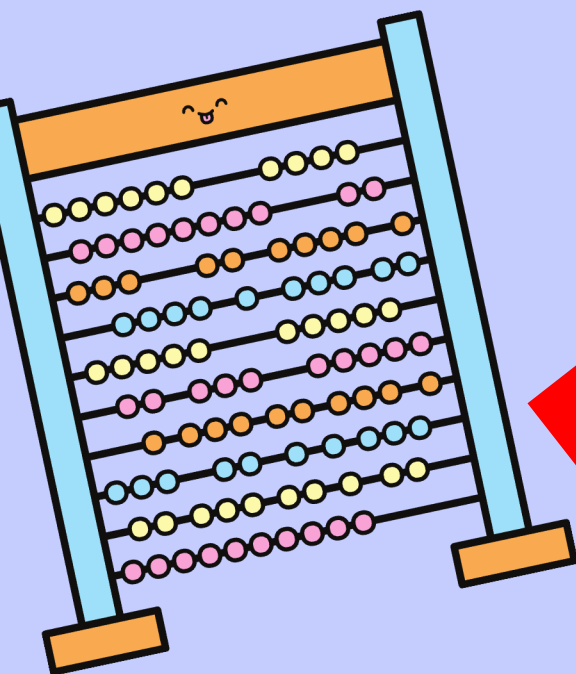
If the whole is unknown, combine the parts.

Substitute your result to check.





Well Done!



PREVIEW

# Find the Hidden Number

## Quiz



# Question 1

$27 + ? = 64$ . What is missing?



# Answer 1

37. The whole is 64, so  $64 - 27 = 37$ . Check  $27 + 37 = 64$ .



## Question 2

? - 27 = 37. What is missing?



## Answer 2

64. Combine the parts  $27 + 7 = 64$ .



# Question 3

How can you check  $64 \div ? = 27$ ?



# Answer 3

$64 - 37 = 27$ . You can also check  $27 + 37 = 64$ .



# Question 11

Solve  $68 - ? = 24$ . Name the whole.



Answer 4

44. The whole is 68;  $68 - 24 = 44$ .



# Question 5

Compare  $68 - ? = 24$  with  $? - 24 = 68$ .



# Answer 5

The first unknown is 4, a part. The second is 92, the whole.



# Question 6

A learner says  $27 - 6 = 37$ . Repair it.



# Answer 6

Reversing subtraction is invalid.  $64 - 27 = 37$ , but  $27 - 64$  is negative 37.



# Question 7

Game card:  $? - 24 = 5$  Show a check.



# Answer 7

60. The whole is  $24 + 36 = 60$  check  $60 - 24 = 36$ .



# Question 8

Compare  $45 + ? = 81$  and  $81 - ? = 45$ .



## Answer 8

Both missing parts are 9 and the whole is 81. The unknown changes position



# Question 1

Solve  $? - 38 = 27$ .



Answer a

65. Combine the two known parts:  $38 + 27 = 65$ .



# Question 10

What evidence supports your last result?



# Answer 10

$65 - 38 = 27$ . A whole of 65 splits into parts 38 and 27.



# Question 11

Is  $64 - 27 = 27 - 64$  true?



# Answer II

No. The first is 37; the second is negative 37. Order matters.



# Question 12

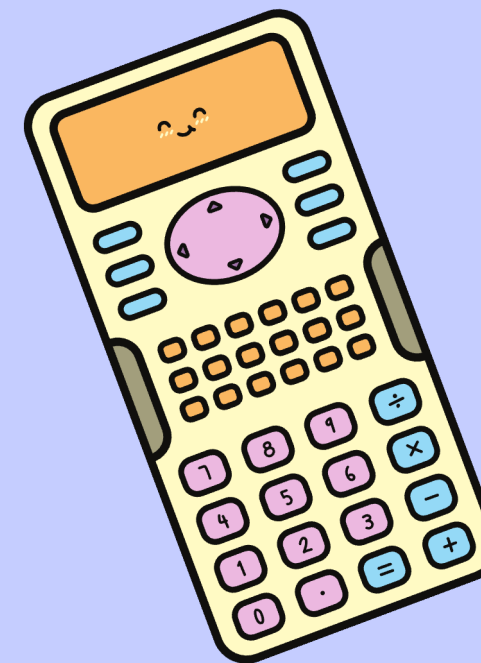
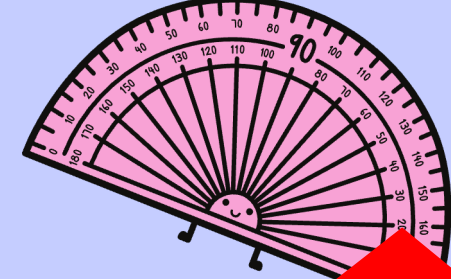
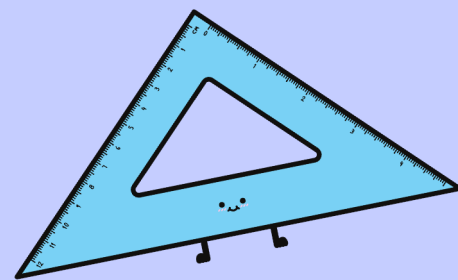
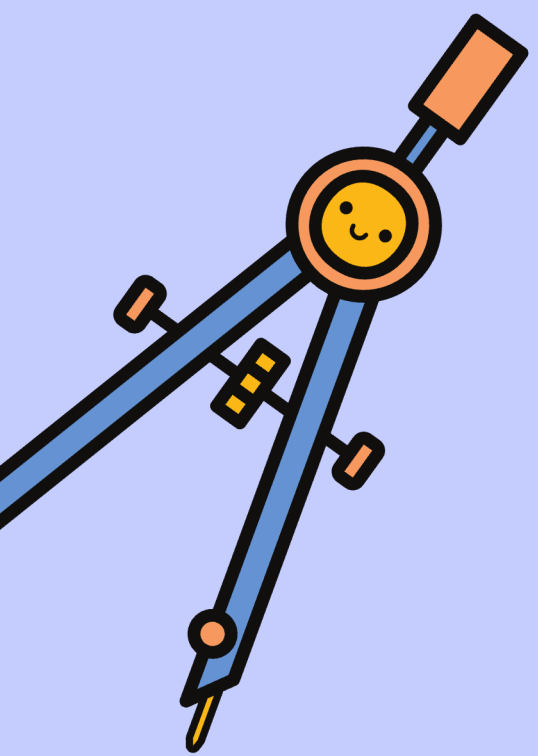
Solve  $? - 24 = 38$  and explain.



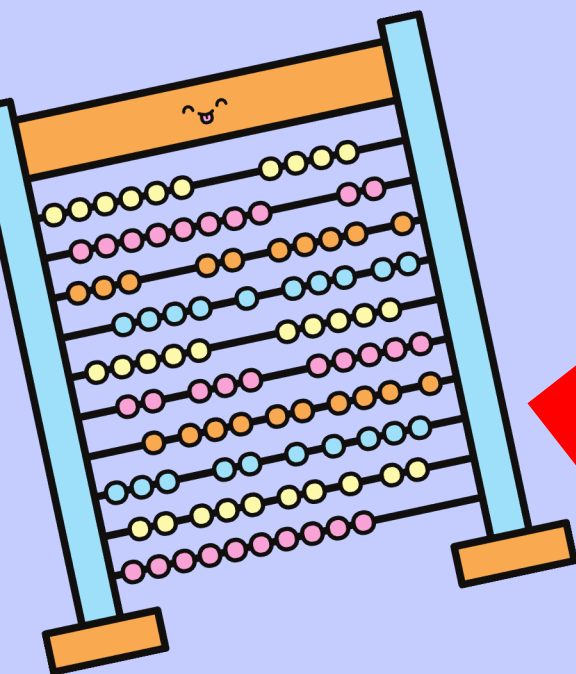
# Answer 12

62. Add the parts 24 and 38. check  $62 - 24 = 38$ .





Well Done!



PREVIEW

