Thinking Skills

Learn it the Feynman way, then practise it

NSW Opportunity Class Placement Test · for students in Year 4

10 chapters | **300** questions | **300** min at test pace | answers for **every** question

Each chapter starts by explaining one idea in plain words, shows you the mistake almost everyone makes, and gives you something to remember it by. Then you practise it thirty times.

Phase 0 hand-made sample. All 300 answers were independently re-derived by solver before printing (300/300 passed). Not reviewed by a qualified teacher — year-level appropriateness is unverified. Not for sale.

Chapter	Questions
1. Putting things in order	30 questions
2. Left, right and next to	30 questions
3. Letter codes	30 questions
4. Groups that overlap	30 questions
5. The odd one out	30 questions
6. Days of the week	30 questions
7. Balancing scales	30 questions
8. Ruling things out	30 questions
9. Finding the rule	30 questions
10. Counting positions	30 questions

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Putting things in order



IN PLAIN WORDS

Order puzzles give you clues one at a time. Draw a line and place each person as you read, instead of trying to hold it all in your head.

EXAMPLE

'A finished ahead of B. B finished ahead of C.' Write A _ _, then A B _, then A B C. The line does the remembering for you.

> COMMON ERROR
>
> Guessing the whole order from ONE clue. A clue like 'A ahead of B' says nothing about where C goes - read every clue before you decide.

REMEMBER IT LIKE THIS

Like lining up for the canteen: you only know your spot once everyone in front of you has arrived.

CHECK YOURSELF

P is ahead of Q. Q is ahead of R. Who is last? (answer: R)

1. 4 children ran a race. Kai finished ahead of Ava. Mila finished ahead of Finn. Kai finished ahead of Mila. Mila finished ahead of Ava. Finn finished last. Who finished first? ZBG57Q

( ) Mila ( ) Finn ( ) Ava ( ) Kai

working

2. 5 children ran a race. Jack finished first. Sam finished ahead of Leo. Nina finished ahead of Sam. Leo finished last. Owen finished ahead of Sam. Jack finished ahead of Owen. Nina finished ahead of Leo. Jack finished ahead of Nina. Owen finished ahead of Nina. Who finished second? 325EU8

( ) Sam ( ) Jack ( ) Owen ( ) Nina

working

3. 4 children ran a race. Zoe finished ahead of Owen. Sam finished ahead of Zoe. Sam finished first. Zoe finished ahead of Ella. Ella finished last. Who finished second? ERGQMN

( ) Sam ( ) Ella ( ) Owen ( ) Zoe

working

4. 4 children ran a race. Ivy finished ahead of Eli. Ruby finished ahead of Mila. Ivy finished ahead of Ruby. Eli finished ahead of Mila. Ivy finished first. Mila finished last. Eli finished ahead of Ruby. Who finished second? C8RHCZ

( ) Ruby ( ) Ivy ( ) Mila ( ) Eli

working

5. 4 children ran a race. Jack finished ahead of Ella. Owen finished last. Ella finished ahead of Owen. Lily finished ahead of Ella. Lily finished first. Who finished third? ZKPKHS

( ) Lily ( ) Ella ( ) Owen ( ) Jack

working

6. 5 children ran a race. Zoe finished ahead of Max. Leo finished ahead of Zoe. Mila finished ahead of Max. Zoe finished ahead of Mila. Leo finished ahead of Mila. Kai finished ahead of Leo. Who finished fifth? HGQFZF

( ) Kai ( ) Zoe ( ) Mila ( ) Max

working

7. 4 children ran a race. Mila finished ahead of Kai. Mia finished ahead of Mila. Noah finished ahead of Kai. Kai finished last. Mila finished ahead of Noah. Who finished second? 4TAEAE

( ) Mila ( ) Kai ( ) Noah ( ) Mia

working

8. 4 children ran a race. Ella finished ahead of Jack. Ivy finished last. Jack finished ahead of Kai. Who finished third? YMG2CK

( ) Ella ( ) Jack ( ) Ivy ( ) Kai

working

9. 4 children ran a race. Leo finished ahead of Mia. Hugo finished last. Ava finished first. Who finished third? 374MVH

( ) Mia ( ) Leo ( ) Hugo ( ) Ava

working

10. 4 children ran a race. Hugo finished ahead of Owen. Noah finished first. Hugo finished ahead of Leo. Leo finished ahead of Owen. Who finished third? Z94EU9

( ) Owen ( ) Noah ( ) Hugo ( ) Leo

working

11. 4 children ran a race. Zoe finished ahead of Grace. Zoe finished first. Mila finished ahead of Ella. Zoe finished ahead of Mila. Mila finished ahead of Grace. Grace finished ahead of Ella. Who finished second? BU93CR

( ) Ella ( ) Zoe ( ) Mila ( ) Grace

working

12. 4 children ran a race. Owen finished ahead of Sam. Ruby finished ahead of Owen. Ella finished ahead of Owen. Sam finished last. Ruby finished ahead of Ella. Who finished second? 33WWZ6

( ) Ruby ( ) Sam ( ) Owen ( ) Ella

working

13. 4 children ran a race. Grace finished last. Mia finished first. Max finished ahead of Grace. Ella finished ahead of Grace. Max finished ahead of Ella. Who finished third? B6VCBZ

( ) Grace ( ) Max ( ) Ella ( ) Mia

working

14. 4 children ran a race. Leo finished ahead of Nina. Nina finished ahead of Ivy. Lily finished ahead of Nina. Leo finished ahead of Lily. Who finished fourth? RPXQTN

( ) Leo ( ) Ivy ( ) Nina ( ) Lily

working

15. 4 children ran a race. Zoe finished ahead of Mia. Ava finished ahead of Ella. Ella finished ahead of Mia. Ava finished ahead of Zoe. Zoe finished ahead of Ella. Who finished fourth? GR5K27

( ) Mia ( ) Ava ( ) Zoe ( ) Ella

working

16. 5 children ran a race. Eli finished ahead of Kai. Ella finished ahead of Kai. Ella finished ahead of Ava. Eli finished ahead of Ella. Grace finished first. Ava finished last. Who finished second? XU5RSB

( ) Grace ( ) Ella ( ) Kai ( ) Eli

working

17. 5 children ran a race. Jack finished ahead of Sam. Mia finished ahead of Hugo. Ivy finished ahead of Jack. Ivy finished ahead of Mia. Sam finished last. Ivy finished first. Mia finished ahead of Jack. Hugo finished ahead of Sam. Jack finished ahead of Hugo. Who finished second? E5V74Y

( ) Mia ( ) Jack ( ) Sam ( ) Hugo

working

18. 5 children ran a race. Mila finished ahead of Hugo. Nina finished ahead of Ava. Nina finished ahead of Ruby. Ruby finished ahead of Ava. Ava finished ahead of Mila. Who finished fifth? 4DZPNS

( ) Nina ( ) Hugo ( ) Mila ( ) Ava

working

19. 5 children ran a race. Kai finished ahead of Max. Leo finished ahead of Kai. Lily finished ahead of Max. Owen finished ahead of Leo. Max finished last. Owen finished first. Kai finished ahead of Lily. Who finished second? D5GG5F

( ) Leo ( ) Max ( ) Kai ( ) Lily

working

20. 5 children ran a race. Leo finished ahead of Max. Sam finished ahead of Zoe. Kai finished ahead of Leo. Max finished ahead of Zoe. Max finished ahead of Sam. Who finished fifth? UVPEP3

( ) Max ( ) Kai ( ) Leo ( ) Zoe

working

21. 4 children ran a race. Mila finished first. Mila finished ahead of Owen. Owen finished ahead of Max. Max finished last. Mila finished ahead of Jack. Jack finished ahead of Max. Jack finished ahead of Owen. Who finished third? BLFQBF

( ) Mila ( ) Jack ( ) Owen ( ) Max

working

22. 4 children ran a race. Eli finished ahead of Sam. Finn finished ahead of Eli. Finn finished first. Owen finished ahead of Eli. Who finished fourth? T8YGCB

( ) Eli ( ) Owen ( ) Finn ( ) Sam

working

23. 5 children ran a race. Ivy finished last. Sam finished ahead of Ella. Noah finished ahead of Jack. Ella finished ahead of Jack. Sam finished first. Sam finished ahead of Noah. Noah finished ahead of Ivy. Ella finished ahead of Noah. Who finished third? 76H96C

( ) Jack ( ) Ivy ( ) Ella ( ) Noah

working

24. 5 children ran a race. Mila finished ahead of Lily. Ruby finished first. Ivy finished ahead of Sam. Mila finished ahead of Ivy. Sam finished last. Ruby finished ahead of Mila. Lily finished ahead of Sam. Ivy finished ahead of Lily. Who finished third? F3J4A8

( ) Lily ( ) Sam ( ) Ruby ( ) Ivy

working

25. 4 children ran a race. Leo finished ahead of Hugo. Mia finished first. Sam finished last. Who finished third? YQWLS3

( ) Leo ( ) Mia ( ) Hugo ( ) Sam

working

26. 5 children ran a race. Ella finished ahead of Hugo. Kai finished ahead of Ella. Kai finished ahead of Jack. Kai finished first. Hugo finished ahead of Max. Jack finished ahead of Ella. Who finished fourth? GBCHT8

( ) Kai ( ) Max ( ) Ella ( ) Hugo

working

27. 5 children ran a race. Zoe finished ahead of Ava. Ava finished ahead of Ella. Sam finished ahead of Finn. Zoe finished ahead of Ella. Ella finished ahead of Finn. Ava finished ahead of Sam. Zoe finished first. Ella finished ahead of Sam. Who finished second? 6B7TAA

( ) Finn ( ) Ava ( ) Sam ( ) Ella

working

28. 4 children ran a race. Max finished ahead of Zoe. Jack finished ahead of Nina. Zoe finished ahead of Jack. Who finished third? P3VA6M

( ) Nina ( ) Zoe ( ) Max ( ) Jack

working

29. 4 children ran a race. Grace finished last. Mila finished ahead of Grace. Mila finished ahead of Nina. Nina finished ahead of Grace. Zoe finished first. Who finished third? PKK485

( ) Grace ( ) Zoe ( ) Mila ( ) Nina

working

30. 4 children ran a race. Max finished last. Hugo finished first. Sam finished ahead of Max. Finn finished ahead of Max. Sam finished ahead of Finn. Who finished second? LL7AGR

( ) Sam ( ) Hugo ( ) Max ( ) Finn

working

Chapter 1 — Answers: Putting things in order

1. **Kai**

Put them in order from the clues: Kai then Mila then Ava then Finn. So first is Kai.

2. **Owen**

Put them in order from the clues: Jack then Owen then Nina then Sam then Leo. So second is Owen.

3. **Zoe**

Put them in order from the clues: Sam then Zoe then Owen then Ella. So second is Zoe.

4. **Eli**

Put them in order from the clues: Ivy then Eli then Ruby then Mila. So second is Eli.

5. **Ella**

Put them in order from the clues: Lily then Jack then Ella then Owen. So third is Ella.

6. **Max**

Put them in order from the clues: Kai then Leo then Zoe then Mila then Max. So fifth is Max.

7. **Mila**

Put them in order from the clues: Mia then Mila then Noah then Kai. So second is Mila.

8. **Kai**

Put them in order from the clues: Ella then Jack then Kai then Ivy. So third is Kai.

9. **Mia**

Put them in order from the clues: Ava then Leo then Mia then Hugo. So third is Mia.

10. **Leo**

Put them in order from the clues: Noah then Hugo then Leo then Owen. So third is Leo.

11. **Mila**

Put them in order from the clues: Zoe then Mila then Grace then Ella. So second is Mila.

12. **Ella**

Put them in order from the clues: Ruby then Ella then Owen then Sam. So second is Ella.

13. **Ella**

Put them in order from the clues: Mia then Max then Ella then Grace. So third is Ella.

14. **Ivy**

Put them in order from the clues: Leo then Lily then Nina then Ivy. So fourth is Ivy.

15. **Mia**

Put them in order from the clues: Ava then Zoe then Ella then Mia. So fourth is Mia.

16. **Eli**

Put them in order from the clues: Grace then Eli then Ella then Kai then Ava. So second is Eli.

17. **Mia**

Put them in order from the clues: Ivy then Mia then Jack then Hugo then Sam. So second is Mia.

18. **Hugo**

Put them in order from the clues: Nina then Ruby then Ava then Mila then Hugo. So fifth is Hugo.

19. **Leo**

Put them in order from the clues: Owen then Leo then Kai then Lily then Max. So second is Leo.

20. **Zoe**

Put them in order from the clues: Kai then Leo then Max then Sam then Zoe. So fifth is Zoe.

21. **Owen**

Put them in order from the clues: Mila then Jack then Owen then Max. So third is Owen.

22. Sam

Put them in order from the clues: Finn then Owen then Eli then Sam. So fourth is Sam.

23. Noah

Put them in order from the clues: Sam then Ella then Noah then Jack then Ivy. So third is Noah.

24. Ivy

Put them in order from the clues: Ruby then Mila then Ivy then Lily then Sam. So third is Ivy.

25. Hugo

Put them in order from the clues: Mia then Leo then Hugo then Sam. So third is Hugo.

26. Hugo

Put them in order from the clues: Kai then Jack then Ella then Hugo then Max. So fourth is Hugo.

27. Ava

Put them in order from the clues: Zoe then Ava then Ella then Sam then Finn. So second is Ava.

28. Jack

Put them in order from the clues: Max then Zoe then Jack then Nina. So third is Jack.

29. Nina

Put them in order from the clues: Zoe then Mila then Nina then Grace. So third is Nina.

30. Sam

Put them in order from the clues: Hugo then Sam then Finn then Max. So second is Sam.

Left, right and next to



IN PLAIN WORDS

'Directly to the right of' means touching. 'To the right of' just means somewhere further along. They are different clues.

EXAMPLE

If the jar is directly to the right of the box, then box and jar are neighbours with nothing between them.

> COMMON ERROR
>
> Treating 'next to' as if it told you WHICH side. 'Next to' can mean either side; 'directly to the right of' picks one.

REMEMBER IT LIKE THIS

Standing in a photo: 'beside me' and 'on my right' are not the same instruction.

CHECK YOURSELF

The lamp is directly right of the vase. Which is further left? (answer: the vase)

1. 4 objects sit in a row on a shelf. The lamp is on the far left. The jar is directly to the right of the vase. The vase is directly to the right of the lamp. Counting from the left, which object is number 4? LZCWQQ

( ) book ( ) lamp ( ) vase ( ) jar

working

2. Four objects sit in a row on a shelf. The vase is somewhere to the right of the plant. The plant is somewhere to the right of the jar. The vase is somewhere to the right of the jar. The box is next to the vase. The box is somewhere to the right of the jar. The jar is next to the plant. The jar is on the far left. The plant is next to the box. Counting from the left, which object is number 3? 4DX9T4

( ) box ( ) vase ( ) plant ( ) jar

working

3. 4 objects sit in a row on a shelf. The clock is directly to the right of the vase. The box is directly to the right of the clock. The vase is on the far left. Counting from the left, which object is number 3? PUC4GF

( ) box ( ) lamp ( ) vase ( ) clock

working

4. Four objects sit in a row on a shelf. The jar is somewhere to the right of the plant. The vase is next to the plant. The plant is next to the jar. The lamp is somewhere to the right of the plant. Counting from the left, which object is number 3? KP9NFG

( ) plant ( ) vase ( ) jar ( ) lamp

working

5. 4 objects sit in a row on a shelf. The clock is directly to the right of the lamp. The jar is on the far left. The box is directly to the right of the jar. Counting from the left, which object is number 4? QPNSTU

( ) box ( ) lamp ( ) clock ( ) jar

working

6. Four objects sit in a row on a shelf. The vase is next to the clock. The lamp is next to the box. The box is somewhere to the right of the lamp. The lamp is somewhere to the right of the clock. The box is somewhere to the right of the vase. The clock is next to the lamp. Counting from the left, which object is number 3? N55LP5

( ) lamp ( ) box ( ) vase ( ) clock

working

7. 4 objects sit in a row on a shelf. The box is on the far left. The vase is directly to the right of the jar. The lamp is directly to the right of the box. Counting from the left, which object is number 4? DMTDTZ

( ) jar ( ) lamp ( ) vase ( ) box

working

8. Four objects sit in a row on a shelf. The box is somewhere to the right of the jar. The box is somewhere to the right of the vase. The jar is next to the clock. The vase is somewhere to the right of the clock. The box is on the far right. The clock is somewhere to the right of the jar. Counting from the left, which object is number 4? 4L9T8A

( ) box ( ) jar ( ) clock ( ) vase

working

9. 4 objects sit in a row on a shelf. The plant is directly to the right of the vase. The jar is directly to the right of the clock. The clock is directly to the right of the plant. Counting from the left, which object is number 3? 3MLZHD

( ) jar ( ) plant ( ) clock ( ) vase

working

10. Four objects sit in a row on a shelf. The jar is next to the clock. The book is next to the vase. The clock is on the far right. The clock is somewhere to the right of the jar. The clock is somewhere to the right of the book. The jar is somewhere to the right of the book. The book is on the far left. Counting from the left, which object is number 3? HSL9AH

( ) book ( ) clock ( ) vase ( ) jar

working

11. 4 objects sit in a row on a shelf. The jar is directly to the right of the clock. The box is on the far left. The book is directly to the right of the jar. Counting from the left, which object is number 3? ZMWGZB

( ) book ( ) jar ( ) box ( ) clock

working

12. Four objects sit in a row on a shelf. The plant is somewhere to the right of the book. The book is on the far left. The lamp is somewhere to the right of the vase. The lamp is on the far right. The book is next to the vase. Counting from the left, which object is number 2? K3UEGN

( ) book ( ) plant ( ) vase ( ) lamp

working

13. 4 objects sit in a row on a shelf. The book is directly to the right of the vase. The vase is directly to the right of the jar. The jar is directly to the right of the lamp. Counting from the left, which object is number 4? UPQYVR

( ) jar ( ) book ( ) vase ( ) lamp

working

14. Four objects sit in a row on a shelf. The lamp is somewhere to the right of the book. The book is next to the lamp. The jar is somewhere to the right of the lamp. The plant is somewhere to the right of the lamp. The jar is somewhere to the right of the plant. Counting from the left, which object is number 1? 3D2UFQ

( ) book ( ) lamp ( ) plant ( ) jar

working

15. 4 objects sit in a row on a shelf. The vase is directly to the right of the lamp. The plant is directly to the right of the box. The lamp is directly to the right of the plant. Counting from the left, which object is number 3? TMBKTT

( ) box ( ) lamp ( ) vase ( ) plant

working

16. Four objects sit in a row on a shelf. The jar is on the far right. The plant is on the far left. The jar is somewhere to the right of the lamp. The lamp is somewhere to the right of the plant. The jar is somewhere to the right of the box. The box is next to the jar. Counting from the left, which object is number 2? XVW6VV

( ) box ( ) plant ( ) lamp ( ) jar

working

17. 4 objects sit in a row on a shelf. The book is directly to the right of the vase. The vase is directly to the right of the jar. The plant is on the far left. Counting from the left, which object is number 3? DZCWKW

( ) vase ( ) book ( ) plant ( ) jar

working

18. Four objects sit in a row on a shelf. The vase is on the far right. The lamp is next to the clock. The plant is somewhere to the right of the clock. The vase is somewhere to the right of the clock. The clock is somewhere to the right of the lamp. Counting from the left, which object is number 2? ZSVM2Z

( ) plant ( ) clock ( ) lamp ( ) vase

working

19. 4 objects sit in a row on a shelf. The jar is on the far left. The book is directly to the right of the plant. The plant is directly to the right of the jar. Counting from the left, which object is number 4? TGR2E3

( ) book ( ) clock ( ) plant ( ) jar

working

20. Four objects sit in a row on a shelf. The box is on the far right. The box is somewhere to the right of the jar. The jar is next to the lamp. The lamp is somewhere to the right of the jar. The jar is on the far left. Counting from the left, which object is number 3? S9HP3C

( ) jar ( ) box ( ) plant ( ) lamp

working

21. 4 objects sit in a row on a shelf. The lamp is directly to the right of the plant. The plant is directly to the right of the vase. The vase is on the far left. Counting from the left, which object is number 4? NW348K

( ) plant ( ) vase ( ) lamp ( ) jar

working

22. Four objects sit in a row on a shelf. The plant is somewhere to the right of the box. The plant is next to the book. The jar is somewhere to the right of the box. The plant is somewhere to the right of the jar. The box is on the far left. The book is on the far right. Counting from the left, which object is number 4? YQHEA6

( ) jar ( ) box ( ) book ( ) plant

working

23. 4 objects sit in a row on a shelf. The book is directly to the right of the plant. The vase is on the far left. The lamp is directly to the right of the vase. Counting from the left, which object is number 2? QPCTRR

( ) vase ( ) lamp ( ) plant ( ) book

working

24. Four objects sit in a row on a shelf. The lamp is somewhere to the right of the vase. The lamp is next to the box. The lamp is somewhere to the right of the clock. The box is somewhere to the right of the lamp. The box is on the far right. The box is somewhere to the right of the clock. The vase is next to the clock. The clock is somewhere to the right of the vase. Counting from the left, which object is number 4? 9QUBGB

( ) box ( ) clock ( ) lamp ( ) vase

working

25. 4 objects sit in a row on a shelf. The vase is directly to the right of the box. The clock is directly to the right of the plant. The box is directly to the right of the clock. Counting from the left, which object is number 4? DWGLHR

( ) box ( ) clock ( ) plant ( ) vase

working

26. Four objects sit in a row on a shelf. The plant is on the far right. The plant is somewhere to the right of the lamp. The lamp is next to the plant. The plant is somewhere to the right of the jar. The jar is on the far left. Counting from the left, which object is number 4? VZCULA

( ) vase ( ) jar ( ) plant ( ) lamp

working

27. 4 objects sit in a row on a shelf. The jar is on the far left. The clock is directly to the right of the jar. The lamp is directly to the right of the vase. Counting from the left, which object is number 3? N6XAKC

( ) jar ( ) lamp ( ) vase ( ) clock

working

28. Four objects sit in a row on a shelf. The box is somewhere to the right of the plant. The plant is somewhere to the right of the vase. The box is somewhere to the right of the vase. The box is on the far right. The clock is next to the vase. The clock is on the far left. Counting from the left, which object is number 2? AARCMU

( ) plant ( ) vase ( ) box ( ) clock

working

29. 4 objects sit in a row on a shelf. The clock is directly to the right of the plant. The jar is directly to the right of the clock. The plant is on the far left. Counting from the left, which object is number 1? LCYEX6

( ) plant ( ) jar ( ) clock ( ) lamp

working

30. Four objects sit in a row on a shelf. The vase is on the far left. The jar is next to the box. The box is somewhere to the right of the vase. The box is somewhere to the right of the lamp. The vase is next to the lamp. The jar is somewhere to the right of the vase. The box is somewhere to the right of the jar. Counting from the left, which object is number 1? DMQEWT

( ) vase ( ) box ( ) jar ( ) lamp

working

Chapter 2 — Answers: Left, right and next to

1. book

From the clues the row is: lamp, vase, jar, book. Number 4 is the book.

2. box

Only one order fits every clue: jar, plant, box, vase. Number 3 is the box.

3. box

From the clues the row is: vase, clock, box, lamp. Number 3 is the box.

4. jar

Only one order fits every clue: vase, plant, jar, lamp. Number 3 is the jar.

5. clock

From the clues the row is: jar, box, lamp, clock. Number 4 is the clock.

6. lamp

Only one order fits every clue: vase, clock, lamp, box. Number 3 is the lamp.

7. vase

From the clues the row is: box, lamp, jar, vase. Number 4 is the vase.

8. box

Only one order fits every clue: jar, clock, vase, box. Number 4 is the box.

9. clock

From the clues the row is: vase, plant, clock, jar. Number 3 is the clock.

10. jar

Only one order fits every clue: book, vase, jar, clock. Number 3 is the jar.

11. jar

From the clues the row is: box, clock, jar, book. Number 3 is the jar.

12. vase

Only one order fits every clue: book, vase, plant, lamp. Number 2 is the vase.

13. book

From the clues the row is: lamp, jar, vase, book. Number 4 is the book.

14. book

Only one order fits every clue: book, lamp, plant, jar. Number 1 is the book.

15. lamp

From the clues the row is: box, plant, lamp, vase. Number 3 is the lamp.

16. lamp

Only one order fits every clue: plant, lamp, box, jar. Number 2 is the lamp.

17. vase

From the clues the row is: plant, jar, vase, book. Number 3 is the vase.

18. clock

Only one order fits every clue: lamp, clock, plant, vase. Number 2 is the clock.

19. clock

From the clues the row is: jar, plant, book, clock. Number 4 is the clock.

20. plant

Only one order fits every clue: jar, lamp, plant, box. Number 3 is the plant.

21. jar

From the clues the row is: vase, plant, lamp, jar. Number 4 is the jar.

22. book

Only one order fits every clue: box, jar, plant, book. Number 4 is the book.

23. lamp

From the clues the row is: vase, lamp, plant, book. Number 2 is the lamp.

24. box

Only one order fits every clue: vase, clock, lamp, box. Number 4 is the box.

25. vase

From the clues the row is: plant, clock, box, vase. Number 4 is the vase.

26. plant

Only one order fits every clue: jar, vase, lamp, plant. Number 4 is the plant.

27. vase

From the clues the row is: jar, clock, vase, lamp. Number 3 is the vase.

28. vase

Only one order fits every clue: clock, vase, plant, box. Number 2 is the vase.

29. plant

From the clues the row is: plant, clock, jar, lamp. Number 1 is the plant.

30. vase

Only one order fits every clue: vase, lamp, jar, box. Number 1 is the vase.

Letter codes



IN PLAIN WORDS

A code usually moves every letter the same number of places along the alphabet. Find how far it moved, then do the same to the new word. One thing you must know: after Z you start again at A.

EXAMPLE

CAT becomes DBU. C to D is one place, A to B is one place, T to U is one place, so the rule is ‘move forward 1’. Now the wrap-around: Y moved forward 4 places becomes C, because after Y comes Z and then you go back to the start: Z, A, B, C.

COMMON ERROR

Getting stuck at the end of the alphabet. If a letter runs past Z, keep counting from A. The alphabet loops, it does not stop.

REMEMBER IT LIKE THIS

The alphabet is a circle, not a line. Walk past Z and you are back at A.

CHECK YOURSELF

A code moves every letter 3 places forward. What does Z become? (answer: C)

1. In a code, every letter is moved the same number of places along the alphabet. XRA is written as BVE. Using the same code, how is TOP written? AULE64

( ) PKL ( ) XST ( ) TOP ( ) YTU

working

2. In a code, every letter is moved the same number of places along the alphabet. PIG is written as RKI. Using the same code, how is NET written? SVWKBG

( ) NET ( ) PGV ( ) QHW ( ) LCR

working

3. In a code, every letter is moved the same number of places along the alphabet. BUS is written as CVT. Using the same code, how is WAX written? 2XCZD4

( ) VZW ( ) YCZ ( ) XBY ( ) WAX

working

4. In a code, every letter is moved the same number of places along the alphabet. ICE is written as KEG. Using the same code, how is TOP written? MN273A

( ) WRS ( ) VQR ( ) RMN ( ) TOP

working

5. In a code, every letter is moved the same number of places along the alphabet. BUS is written as DWU. Using the same code, how is GAS written? HFVGYH

( ) GAS ( ) JDV ( ) ICU ( ) EYQ

working

6. In a code, every letter is moved the same number of places along the alphabet. YES is written as AGU. Using the same code, how is ZIP written? FPRJ36

( ) ZIP ( ) BKR ( ) XGN ( ) CLS

working

7. In a code, every letter is moved the same number of places along the alphabet. XRA is written as YSB. Using the same code, how is BED written? 853BWG

( ) DGF ( ) ADC ( ) BED ( ) CFE

working

8. In a code, every letter is moved the same number of places along the alphabet. ZOO is written as DSS. Using the same code, how is HEN written? VAR9BH

( ) MJS ( ) LIR ( ) DAJ ( ) HEN

working

9. In a code, every letter is moved the same number of places along the alphabet. PEN is written as QFO. Using the same code, how is JAR written? CBVC7T

( ) JAR ( ) LCT ( ) IZQ ( ) KBS

working

10. In a code, every letter is moved the same number of places along the alphabet. KEY is written as NHB. Using the same code, how is YES written? 2YYMTM

( ) CIW ( ) BHV ( ) YES ( ) VBP

working

11. In a code, every letter is moved the same number of places along the alphabet. KEY is written as LFZ. Using the same code, how is GAS written? A3GG6W

( ) ICU ( ) GAS ( ) HBT ( ) FZR

working

12. In a code, every letter is moved the same number of places along the alphabet. EGG is written as GII. Using the same code, how is HEN written? HGATSW

( ) FCL ( ) JGP ( ) KHQ ( ) HEN

working

13. In a code, every letter is moved the same number of places along the alphabet. WAX is written as AEB. Using the same code, how is LID written? 9X8365

( ) QNI ( ) LID ( ) HEZ ( ) PMH

working

14. In a code, every letter is moved the same number of places along the alphabet. BAG is written as CBH. Using the same code, how is GAS written? V84B3P

( ) ICU ( ) GAS ( ) FZR ( ) HBT

working

15. In a code, every letter is moved the same number of places along the alphabet. CAT is written as GEX. Using the same code, how is RUN written? 3RWRT7

( ) VYR ( ) RUN ( ) WZS ( ) NQJ

working

16. In a code, every letter is moved the same number of places along the alphabet. XRA is written as BVE. Using the same code, how is TIN written? WVR2PK

( ) TIN ( ) XMR ( ) YNS ( ) PEJ

working

17. In a code, every letter is moved the same number of places along the alphabet. CUP is written as FXS. Using the same code, how is HEN written? PR6YNU

( ) LIR ( ) HEN ( ) KHQ ( ) EBK

working

18. In a code, every letter is moved the same number of places along the alphabet. XRA is written as ZTC. Using the same code, how is LID written? 7BANAF

( ) JGB ( ) OLG ( ) NKF ( ) LID

working

19. In a code, every letter is moved the same number of places along the alphabet. EGG is written as FHH. Using the same code, how is RUN written? ZGGTD3

( ) SVO ( ) RUN ( ) QTM ( ) TWP

working

20. In a code, every letter is moved the same number of places along the alphabet. ARM is written as EVQ. Using the same code, how is LID written? 49TTDL

( ) HEZ ( ) QNI ( ) PMH ( ) LID

working

21. In a code, every letter is moved the same number of places along the alphabet. WAX is written as YCZ. Using the same code, how is TIN written? YDTE8J

( ) RGL ( ) WLQ ( ) VKP ( ) TIN

working

22. In a code, every letter is moved the same number of places along the alphabet. YAK is written as ACM. Using the same code, how is TIN written? WFFBSR

( ) WLQ ( ) VKP ( ) TIN ( ) RGL

working

23. In a code, every letter is moved the same number of places along the alphabet. FOX is written as GPY. Using the same code, how is MUG written? E87ZNW

( ) MUG ( ) NVH ( ) LTF ( ) OWI

working

24. In a code, every letter is moved the same number of places along the alphabet. XRA is written as BVE. Using the same code, how is GAS written? M2LF2F

( ) KEW ( ) GAS ( ) LFX ( ) CWO

working

25. In a code, every letter is moved the same number of places along the alphabet. XRA is written as AUD. Using the same code, how is YES written? F6YS5F

( ) BHV ( ) YES ( ) CIW ( ) VBP

working

26. In a code, every letter is moved the same number of places along the alphabet. CAT is written as FDW. Using the same code, how is LID written? XZBE3P

( ) PMH ( ) LID ( ) IFA ( ) OLG

working

27. In a code, every letter is moved the same number of places along the alphabet. YES is written as ZFT. Using the same code, how is ZOO written? 674WX2

( ) YNN ( ) ZOO ( ) BQQ ( ) APP

working

28. In a code, every letter is moved the same number of places along the alphabet. ZOO is written as CRR. Using the same code, how is GAS written? AN2KZN

( ) JDV ( ) GAS ( ) KEW ( ) DXP

working

29. In a code, every letter is moved the same number of places along the alphabet. MAP is written as NBQ. Using the same code, how is GAS written? 9Q256Z

( ) GAS ( ) HBT ( ) ICU ( ) FZR

working

30. In a code, every letter is moved the same number of places along the alphabet. HAT is written as JCV. Using the same code, how is HEN written? S9BP7S

( ) KHQ ( ) JGP ( ) FCL ( ) HEN

working

Chapter 3 — Answers: Letter codes

1. XST

Each letter moves 4 places forward in the alphabet (XRA to BVE). Doing the same to TOP gives XST.

2. PGV

Each letter moves 2 places forward in the alphabet (PIG to RKI). Doing the same to NET gives PGV.

3. XBY

Each letter moves 1 place forward in the alphabet (BUS to CVT). Doing the same to WAX gives XBY.

4. VQR

Each letter moves 2 places forward in the alphabet (ICE to KEG). Doing the same to TOP gives VQR.

5. ICU

Each letter moves 2 places forward in the alphabet (BUS to DWU). Doing the same to GAS gives ICU.

6. BKR

Each letter moves 2 places forward in the alphabet (YES to AGU). Doing the same to ZIP gives BKR.

7. CFE

Each letter moves 1 place forward in the alphabet (XRA to YSB). Doing the same to BED gives CFE.

8. LIR

Each letter moves 4 places forward in the alphabet (ZOO to DSS). Doing the same to HEN gives LIR.

9. KBS

Each letter moves 1 place forward in the alphabet (PEN to QFO). Doing the same to JAR gives KBS.

10. BHV

Each letter moves 3 places forward in the alphabet (KEY to NHB). Doing the same to YES gives BHV.

11. HBT

Each letter moves 1 place forward in the alphabet (KEY to LFZ). Doing the same to GAS gives HBT.

12. JGP

Each letter moves 2 places forward in the alphabet (EGG to GII). Doing the same to HEN gives JGP.

13. PMH

Each letter moves 4 places forward in the alphabet (WAX to AEB). Doing the same to LID gives PMH.

14. HBT

Each letter moves 1 place forward in the alphabet (BAG to CBH). Doing the same to GAS gives HBT.

15. VYR

Each letter moves 4 places forward in the alphabet (CAT to GEX). Doing the same to RUN gives VYR.

16. XMR

Each letter moves 4 places forward in the alphabet (XRA to BVE). Doing the same to TIN gives XMR.

17. KHQ

Each letter moves 3 places forward in the alphabet (CUP to FXS). Doing the same to HEN gives KHQ.

18. NKF

Each letter moves 2 places forward in the alphabet (XRA to ZTC). Doing the same to LID gives NKF.

19. SVO

Each letter moves 1 place forward in the alphabet (EGG to FHH). Doing the same to RUN gives SVO.

20. PMH

Each letter moves 4 places forward in the alphabet (ARM to EVQ). Doing the same to LID gives PMH.

21. VKP

Each letter moves 2 places forward in the alphabet (WAX to YCZ). Doing the same to TIN gives VKP.

22. VKP

Each letter moves 2 places forward in the alphabet (YAK to ACM). Doing the same to TIN gives VKP.

23. NVH

Each letter moves 1 place forward in the alphabet (FOX to GPY). Doing the same to MUG gives NVH.

24. KEW

Each letter moves 4 places forward in the alphabet (XRA to BVE). Doing the same to GAS gives KEW.

25. BHV

Each letter moves 3 places forward in the alphabet (XRA to AUD). Doing the same to YES gives BHV.

26. OLG

Each letter moves 3 places forward in the alphabet (CAT to FDW). Doing the same to LID gives OLG.

27. APP

Each letter moves 1 place forward in the alphabet (YES to ZFT). Doing the same to ZOO gives APP.

28. JDV

Each letter moves 3 places forward in the alphabet (ZOO to CRR). Doing the same to GAS gives JDV.

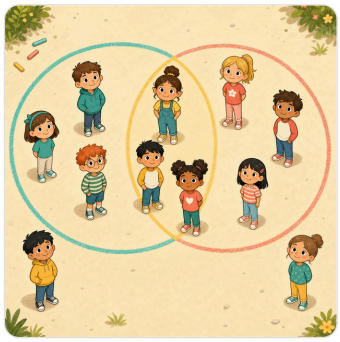
29. HBT

Each letter moves 1 place forward in the alphabet (MAP to NBQ). Doing the same to GAS gives HBT.

30. JGP

Each letter moves 2 places forward in the alphabet (HAT to JCV). Doing the same to HEN gives JGP.

Groups that overlap



IN PLAIN WORDS

Two overlapping groups get asked about in four different ways, and each one needs a different sum. ‘At least one’ means one or both.

EXAMPLE

Class of 25. 12 play soccer, 10 play netball, 4 play both. AT LEAST ONE: 12 + 10 - 4 = 18 (the 4 were counted twice, so take them off once). ONLY SOCCER: 12 - 4 = 8. ONLY NETBALL: 10 - 4 = 6. NEITHER: 25 - 18 = 7 (the whole class, minus everyone who plays at least one).

COMMON ERROR

Using the ‘at least one’ sum for every question. ‘Only soccer’ and ‘neither’ are different sums. Read which one is being asked before you start.

REMEMBER IT LIKE THIS

Two circles that overlap. The middle belongs to both, each outer part belongs to one, and outside both circles there is still the rest of the class.

CHECK YOURSELF

20 students, 9 like apples, 8 like pears, 3 like both. How many like at least one? How many like only pears? How many like neither? (answer: 14, then 5, then 6)

1. In a class of 29 students, 8 play soccer and 14 play netball. 4 play both. How many play at least one of the two sports? JD8YAR

( ) 11 ( ) 18 ( ) 4 ( ) 22

working

2. 12 students go to swimming and 18 go to athletics. Altogether 23 students go to at least one of them. How many go to BOTH? WMJRMJ

( ) 9 ( ) 7 ( ) 11 ( ) 30

working

3. In a class of 31 students, 13 play soccer and 10 play netball. 2 play both. How many play neither sport? A4M7QF

( ) 12 ( ) 10 ( ) 23 ( ) 11

working

4. 9 students go to choir and 17 go to band. Altogether 20 students go to at least one of them. How many go to BOTH? F3FJG7

( ) 6 ( ) 26 ( ) 8 ( ) 11

working

5. In a class of 35 students, 17 play soccer and 14 play netball. 5 play both. How many play only netball? YWCD72

( ) 12 ( ) 31 ( ) 14 ( ) 9

working

6. 11 students go to swimming and 10 go to athletics. Altogether 18 students go to at least one of them. How many go to BOTH? CNEFL7

( ) 7 ( ) 21 ( ) 5 ( ) 3

working

7. In a class of 25 students, 9 play soccer and 5 play netball. 2 play both. How many play only netball? W5L7LR

( ) 13 ( ) 3 ( ) 7 ( ) 14

working

8. 8 students go to drama club and 7 go to coding club. Altogether 12 students go to at least one of them. How many go to BOTH? HE79YG

( ) 3 ( ) 15 ( ) 5 ( ) 4

working

9. In a class of 20 students, 13 play soccer and 10 play netball. 5 play both. How many play neither sport? GW8P8R

( ) 2 ( ) 23 ( ) 7 ( ) 8

working

10. 9 students go to choir and 10 go to band. Altogether 16 students go to at least one of them. How many go to BOTH? VVUMDH

( ) 3 ( ) 19 ( ) 5 ( ) 7

working

11. In a class of 27 students, 4 play soccer and 4 play netball. 2 play both. How many play only soccer? AZ5AXW

( ) 21 ( ) 8 ( ) 2 ( ) 4

working

12. 14 students go to drama club and 13 go to coding club. Altogether 20 students go to at least one of them. How many go to BOTH? F57Z5R

( ) 9 ( ) 6 ( ) 27 ( ) 7

working

13. In a class of 33 students, 16 play soccer and 8 play netball. 6 play both. How many play only netball? EYWXHU

( ) 24 ( ) 15 ( ) 10 ( ) 2

working

14. 17 students go to drama club and 8 go to coding club. Altogether 20 students go to at least one of them. How many go to BOTH? AY82WG

( ) 25 ( ) 3 ( ) 5 ( ) 7

working

15. In a class of 28 students, 16 play soccer and 12 play netball. 7 play both. How many play neither sport? YK2ERU

( ) 7 ( ) 9 ( ) 28 ( ) 14

working

16. 9 students go to drama club and 12 go to coding club. Altogether 19 students go to at least one of them. How many go to BOTH? PFA6PZ

( ) 21 ( ) 10 ( ) 2 ( ) 4

working

17. In a class of 35 students, 9 play soccer and 20 play netball. 6 play both. How many play neither sport? GEFFDA

( ) 3 ( ) 12 ( ) 29 ( ) 18

working

18. 16 students go to drama club and 16 go to coding club. Altogether 26 students go to at least one of them. How many go to BOTH? 8D5LV9

( ) 6 ( ) 8 ( ) 10 ( ) 32

working

19. In a class of 29 students, 14 play soccer and 6 play netball. 2 play both. How many play only soccer? X4SNNB

( ) 4 ( ) 12 ( ) 11 ( ) 20

working

20. 7 students go to drama club and 11 go to coding club. Altogether 16 students go to at least one of them. How many go to BOTH? UCMTUP

( ) 9 ( ) 4 ( ) 18 ( ) 2

working

21. In a class of 30 students, 19 play soccer and 17 play netball. 6 play both. How many play neither sport? FJ6P6Z

( ) 36 ( ) 3 ( ) 13 ( ) 0

working

22. 14 students go to choir and 9 go to band. Altogether 20 students go to at least one of them. How many go to BOTH? JNM8F4

( ) 3 ( ) 6 ( ) 5 ( ) 23

working

23. In a class of 37 students, 18 play soccer and 18 play netball. 7 play both. How many play only soccer? EE944S

( ) 18 ( ) 11 ( ) 8 ( ) 36

working

24. 15 students go to choir and 14 go to band. Altogether 24 students go to at least one of them. How many go to BOTH? BAZ8BW

( ) 29 ( ) 5 ( ) 7 ( ) 9

working

25. In a class of 31 students, 20 play soccer and 18 play netball. 7 play both. How many play only soccer? RS96C9

( ) 13 ( ) 38 ( ) 11 ( ) 16

working

26. 7 students go to choir and 7 go to band. Altogether 11 students go to at least one of them. How many go to BOTH? ATM46X

( ) 3 ( ) 5 ( ) 4 ( ) 14

working

27. In a class of 30 students, 8 play soccer and 4 play netball. 2 play both. How many play at least one of the two sports? AX72M5

( ) 12 ( ) 10 ( ) 6 ( ) 20

working

28. 13 students go to swimming and 11 go to athletics. Altogether 16 students go to at least one of them. How many go to BOTH? WC5XT9

( ) 3 ( ) 24 ( ) 10 ( ) 8

working

29. In a class of 34 students, 18 play soccer and 8 play netball. 4 play both. How many play only soccer? NYLHWD

( ) 12 ( ) 26 ( ) 14 ( ) 4

working

30. 15 students go to chess club and 19 go to art club. Altogether 26 students go to at least one of them. How many go to BOTH? SUMALG

( ) 11 ( ) 8 ( ) 10 ( ) 34

working

Chapter 4 — Answers: Groups that overlap

1. **18**

At least one sport: 8 + 14 - 4 = 18 (the 4 who play both were counted twice).

2. **7**

Adding the two clubs gives 12 + 18 = 30, but that counts the both-club students twice. 30 - 23 = 7 go to both.

3. **10**

At least one sport: 13 + 10 - 2 = 21. So 31 - 21 = 10 play neither.

4. **6**

Adding the two clubs gives 9 + 17 = 26, but that counts the both-club students twice. 26 - 20 = 6 go to both.

5. **9**

Only netball = 14 - 5 = 9. (The union is not needed here.)

6. **3**

Adding the two clubs gives 11 + 10 = 21, but that counts the both-club students twice. 21 - 18 = 3 go to both.

7. **3**

Only netball = 5 - 2 = 3. (The union is not needed here.)

8. **3**

Adding the two clubs gives 8 + 7 = 15, but that counts the both-club students twice. 15 - 12 = 3 go to both.

9. **2**

At least one sport: 13 + 10 - 5 = 18. So 20 - 18 = 2 play neither.

10. **3**

Adding the two clubs gives 9 + 10 = 19, but that counts the both-club students twice. 19 - 16 = 3 go to both.

11. **2**

Only soccer = 4 - 2 = 2. (The union is not needed here.)

12. **7**

Adding the two clubs gives 14 + 13 = 27, but that counts the both-club students twice. 27 - 20 = 7 go to both.

13. **2**

Only netball = 8 - 6 = 2. (The union is not needed here.)

14. **5**

Adding the two clubs gives 17 + 8 = 25, but that counts the both-club students twice. 25 - 20 = 5 go to both.

15. **7**

At least one sport: 16 + 12 - 7 = 21. So 28 - 21 = 7 play neither.

16. **2**

Adding the two clubs gives 9 + 12 = 21, but that counts the both-club students twice. 21 - 19 = 2 go to both.

17. **12**

At least one sport: 9 + 20 - 6 = 23. So 35 - 23 = 12 play neither.

18. **6**

Adding the two clubs gives 16 + 16 = 32, but that counts the both-club students twice. 32 - 26 = 6 go to both.

19. **12**

Only soccer = 14 - 2 = 12. (The union is not needed here.)

20. **2**

Adding the two clubs gives 7 + 11 = 18, but that counts the both-club students twice. 18 - 16 = 2 go to both.

21. **0**

At least one sport: 19 + 17 - 6 = 30. So 30 - 30 = 0 play neither.

22. **3**

Adding the two clubs gives 14 + 9 = 23, but that counts the both-club students twice. 23 - 20 = 3 go to both.

23. **11**

Only soccer = 18 - 7 = 11. (The union is not needed here.)

24. **5**

Adding the two clubs gives 15 + 14 = 29, but that counts the both-club students twice. 29 - 24 = 5 go to both.

25. **13**

Only soccer = 20 - 7 = 13. (The union is not needed here.)

26. **3**

Adding the two clubs gives 7 + 7 = 14, but that counts the both-club students twice. 14 - 11 = 3 go to both.

27. **10**

At least one sport: 8 + 4 - 2 = 10 (the 2 who play both were counted twice).

28. **8**

Adding the two clubs gives 13 + 11 = 24, but that counts the both-club students twice. 24 - 16 = 8 go to both.

29. **14**

Only soccer = 18 - 4 = 14. (The union is not needed here.)

30. **8**

Adding the two clubs gives 15 + 19 = 34, but that counts the both-club students twice. 34 - 26 = 8 go to both.

CHAPTER 5 OF 10

The odd one out



IN PLAIN WORDS

Look for a RULE the numbers share, not for the one that looks different.

EXAMPLE

12, 18, 24, 25. The first three are all in the 6 times table. 25 is not, so 25 is the odd one out.

COMMON ERROR

Picking the biggest or smallest number because it ‘stands out’. Size is almost never the rule.

REMEMBER IT LIKE THIS

A club has a joining rule. You are looking for who does not meet it.

CHECK YOURSELF

Three of these are multiples of 5 and one is not. Which is NOT a multiple of 5: 15, 20, 26, 35? (answer: 26)

1. Three of these numbers are multiples of 4 and one is not. Which one is NOT a multiple of 4? 48, 37, 40, 16 UWYDUY

( ) 48 ( ) 40 ( ) 16 ( ) 37

working

2. Three of these numbers belong together and one does not. Which is the odd one out? 39, 14, 27, 21 6VP7L7

( ) 27 ( ) 14 ( ) 39 ( ) 21

working

3. Three of these numbers are multiples of 9 and one is not. Which one is NOT a multiple of 9? 54, 69, 90, 36 EMXSGV

( ) 69 ( ) 36 ( ) 90 ( ) 54

working

4. Three of these numbers belong together and one does not. Which is the odd one out? 44, 52, 40, 10 6RMCW3

( ) 44 ( ) 10 ( ) 52 ( ) 40

working

5. Three of these numbers are multiples of 11 and one is not. Which one is NOT a multiple of 11? 44, 88, 33, 53 UPMFLE

( ) 44 ( ) 53 ( ) 88 ( ) 33

working

6. Three of these numbers belong together and one does not. Which is the odd one out? 21, 33, 35, 45 AP7WEG

( ) 35 ( ) 21 ( ) 33 ( ) 45

working

7. Three of these numbers are multiples of 6 and one is not. Which one is NOT a multiple of 6? 21, 12, 66, 30 GF4WAR

( ) 66 ( ) 21 ( ) 12 ( ) 30

working

8. Three of these numbers belong together and one does not. Which is the odd one out? 28, 40, 32, 50 LXE3Y9

( ) 40 ( ) 50 ( ) 32 ( ) 28

working

9. Three of these numbers are multiples of 6 and one is not. Which one is NOT a multiple of 6? 40, 30, 72, 66 YSPWLE

( ) 40 ( ) 72 ( ) 66 ( ) 30

working

10. Three of these numbers belong together and one does not. Which is the odd one out? 20, 45, 42, 39 4FJ8M8

( ) 39 ( ) 42 ( ) 20 ( ) 45

working

11. Three of these numbers are multiples of 8 and one is not. Which one is NOT a multiple of 8? 56, 32, 47, 24 ZMZ54C

( ) 47 ( ) 24 ( ) 32 ( ) 56

working

12. Three of these numbers belong together and one does not. Which is the odd one out? 32, 40, 60, 33 6ETK39

( ) 40 ( ) 32 ( ) 60 ( ) 33

working

13. Three of these numbers are multiples of 6 and one is not. Which one is NOT a multiple of 6? 72, 69, 60, 24 JE9SXJ

( ) 72 ( ) 60 ( ) 24 ( ) 69

working

14. Three of these numbers belong together and one does not. Which is the odd one out? 51, 65, 45, 55 5KV3JQ

( ) 55 ( ) 65 ( ) 51 ( ) 45

working

15. Three of these numbers are multiples of 4 and one is not. Which one is NOT a multiple of 4? 40, 45, 20, 48 N6NZQW

( ) 20 ( ) 48 ( ) 45 ( ) 40

working

16. Three of these numbers belong together and one does not. Which is the odd one out? 9, 20, 65, 40 XR7HGA

( ) 65 ( ) 9 ( ) 20 ( ) 40

working

17. Three of these numbers are multiples of 7 and one is not. Which one is NOT a multiple of 7? 56, 14, 41, 77 3VF8M6

( ) 56 ( ) 77 ( ) 14 ( ) 41

working

18. Three of these numbers belong together and one does not. Which is the odd one out? 16, 15, 56, 36 ER98RT

( ) 16 ( ) 15 ( ) 56 ( ) 36

working

19. Three of these numbers are multiples of 8 and one is not. Which one is NOT a multiple of 8? 40, 79, 96, 16 HM4ZKN

( ) 16 ( ) 79 ( ) 96 ( ) 40

working

20. Three of these numbers belong together and one does not. Which is the odd one out? 27, 36, 24, 49 KWUJTA

( ) 36 ( ) 27 ( ) 49 ( ) 24

working

21. Three of these numbers are multiples of 7 and one is not. Which one is NOT a multiple of 7? 34, 84, 42, 28 KMD6SY

( ) 42 ( ) 34 ( ) 28 ( ) 84

working

22. Three of these numbers belong together and one does not. Which is the odd one out? 21, 28, 24, 27 V8BEV6

( ) 28 ( ) 27 ( ) 21 ( ) 24

working

23. Three of these numbers are multiples of 9 and one is not. Which one is NOT a multiple of 9? 44, 99, 18, 27 6JFVS4

( ) 44 ( ) 27 ( ) 99 ( ) 18

working

24. Three of these numbers belong together and one does not. Which is the odd one out? 45, 55, 15, 16 8F6CXC

( ) 16 ( ) 15 ( ) 45 ( ) 55

working

25. Three of these numbers are multiples of 8 and one is not. Which one is NOT a multiple of 8? 38, 32, 64, 24 QYPLW6

( ) 38 ( ) 64 ( ) 32 ( ) 24

working

26. Three of these numbers belong together and one does not. Which is the odd one out? 20, 37, 60, 45 5UXHY5

( ) 60 ( ) 45 ( ) 20 ( ) 37

working

27. Three of these numbers are multiples of 8 and one is not. Which one is NOT a multiple of 8? 48, 70, 96, 16 P97DYQ

( ) 70 ( ) 16 ( ) 96 ( ) 48

working

28. Three of these numbers belong together and one does not. Which is the odd one out? 45, 27, 35, 65 37F29D

( ) 45 ( ) 65 ( ) 27 ( ) 35

working

29. Three of these numbers are multiples of 3 and one is not. Which one is NOT a multiple of 3? 22, 21, 24, 15 W2XYES

( ) 22 ( ) 21 ( ) 24 ( ) 15

working

30. Three of these numbers belong together and one does not. Which is the odd one out? 30, 10, 15, 45 5EZC52

( ) 30 ( ) 45 ( ) 10 ( ) 15

working

Chapter 5 — Answers: The odd one out

1. **37**

16, 40, 48 are all multiples of 4. 37 is not, so it is the odd one out.

2. **14**

21, 27, 39 are all multiples of 3. 14 is not, so it is the odd one out.

3. **69**

36, 54, 90 are all multiples of 9. 69 is not, so it is the odd one out.

4. **10**

40, 44, 52 are all multiples of 4. 10 is not, so it is the odd one out.

5. **53**

33, 44, 88 are all multiples of 11. 53 is not, so it is the odd one out.

6. **35**

21, 33, 45 are all multiples of 3. 35 is not, so it is the odd one out.

7. **21**

12, 30, 66 are all multiples of 6. 21 is not, so it is the odd one out.

8. **50**

28, 32, 40 are all multiples of 4. 50 is not, so it is the odd one out.

9. **40**

30, 66, 72 are all multiples of 6. 40 is not, so it is the odd one out.

10. **20**

39, 42, 45 are all multiples of 3. 20 is not, so it is the odd one out.

11. **47**

24, 32, 56 are all multiples of 8. 47 is not, so it is the odd one out.

12. **33**

32, 40, 60 are all multiples of 4. 33 is not, so it is the odd one out.

13. **69**

24, 60, 72 are all multiples of 6. 69 is not, so it is the odd one out.

14. **51**

45, 55, 65 are all multiples of 5. 51 is not, so it is the odd one out.

15. **45**

20, 40, 48 are all multiples of 4. 45 is not, so it is the odd one out.

16. **9**

20, 40, 65 are all multiples of 5. 9 is not, so it is the odd one out.

17. **41**

14, 56, 77 are all multiples of 7. 41 is not, so it is the odd one out.

18. **15**

16, 36, 56 are all multiples of 4. 15 is not, so it is the odd one out.

19. **79**

16, 40, 96 are all multiples of 8. 79 is not, so it is the odd one out.

20. **49**

24, 27, 36 are all multiples of 3. 49 is not, so it is the odd one out.

21. **34**

28, 42, 84 are all multiples of 7. 34 is not, so it is the odd one out.

22. **28**

21, 24, 27 are all multiples of 3. 28 is not, so it is the odd one out.

23. **44**

18, 27, 99 are all multiples of 9. 44 is not, so it is the odd one out.

24. **16**

15, 45, 55 are all multiples of 5. 16 is not, so it is the odd one out.

25. **38**

24, 32, 64 are all multiples of 8. 38 is not, so it is the odd one out.

26. **37**

20, 45, 60 are all multiples of 5. 37 is not, so it is the odd one out.

27. **70**

16, 48, 96 are all multiples of 8. 70 is not, so it is the odd one out.

28. **27**

35, 45, 65 are all multiples of 5. 27 is not, so it is the odd one out.

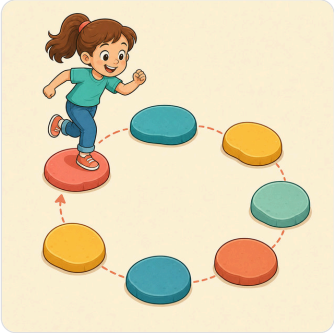
29. **22**

15, 21, 24 are all multiples of 3. 22 is not, so it is the odd one out.

30. **10**

15, 30, 45 are all multiples of 3. 10 is not, so it is the odd one out.

Days of the week



IN PLAIN WORDS

Days repeat every 7. So divide by 7, throw away the whole weeks, and only the leftover matters.

EXAMPLE

10 days after Monday: 10 / 7 = 1 week and 3 days. One week later is Monday again, then 3 more days is Thursday.

> COMMON ERROR
>
> Counting all 10 days one at a time on your fingers. It works but it is slow, and it is where mistakes creep in.

REMEMBER IT LIKE THIS

A week is a loop. After 7 steps you are back where you started.

CHECK YOURSELF

What day is 16 days after Friday? (answer: Sunday)

1. Today is Saturday. What day will it be in 100 days? 63CQTE

( ) Tuesday ( ) Monday ( ) Sunday ( ) Saturday

working

2. Today is Sunday. What day was it 20 days AGO? W6XFQF

( ) Monday ( ) Saturday ( ) Tuesday ( ) Sunday

working

3. Today is Wednesday. What day will it be in 30 days? RHPB7Q

( ) Friday ( ) Saturday ( ) Thursday ( ) Sunday

working

4. Today is Sunday. What day was it 16 days AGO? HRYBU4

( ) Thursday ( ) Friday ( ) Saturday ( ) Tuesday

working

5. Today is Monday. What day will it be in 12 days? BMH7R3

( ) Sunday ( ) Saturday ( ) Tuesday ( ) Friday

working

6. Today is Saturday. What day was it 16 days AGO? MECQCB

( ) Wednesday ( ) Thursday ( ) Monday ( ) Friday

working

7. Today is Sunday. What day will it be in 30 days? 7EN3MP

( ) Thursday ( ) Wednesday ( ) Tuesday ( ) Monday

working

8. Today is Monday. What day was it 20 days AGO? NP4YH8

( ) Wednesday ( ) Monday ( ) Sunday ( ) Tuesday

working

9. Today is Wednesday. What day will it be in 20 days? 279AVN

( ) Monday ( ) Wednesday ( ) Friday ( ) Tuesday

working

10. Today is Wednesday. What day was it 30 days AGO? SGLRCA

( ) Tuesday ( ) Friday ( ) Sunday ( ) Monday

working

11. Today is Thursday. What day will it be in 12 days? L67KKJ

( ) Wednesday ( ) Tuesday ( ) Friday ( ) Monday

working

12. Today is Monday. What day was it 16 days AGO? NA4NLE

( ) Friday ( ) Saturday ( ) Wednesday ( ) Sunday

working

13. Today is Friday. What day will it be in 100 days? D8LMMN

( ) Saturday ( ) Monday ( ) Sunday ( ) Friday

working

14. Today is Tuesday. What day was it 23 days AGO? ZZVS2J

( ) Sunday ( ) Monday ( ) Saturday ( ) Thursday

working

15. Today is Thursday. What day will it be in 20 days? H6Q6FA

( ) Tuesday ( ) Thursday ( ) Saturday ( ) Wednesday

working

16. Today is Friday. What day was it 30 days AGO? P5ATS2

( ) Thursday ( ) Wednesday ( ) Sunday ( ) Tuesday

working

17. Today is Monday. What day will it be in 20 days? 6VN4JF

( ) Sunday ( ) Monday ( ) Saturday ( ) Wednesday

working

18. Today is Sunday. What day was it 30 days AGO? UJRM2A

( ) Thursday ( ) Friday ( ) Tuesday ( ) Saturday

working

19. Today is Tuesday. What day will it be in 100 days? 2L2H3H

( ) Friday ( ) Tuesday ( ) Wednesday ( ) Thursday

working

20. Today is Wednesday. What day was it 16 days AGO? MDYWY5

( ) Sunday ( ) Tuesday ( ) Friday ( ) Monday

working

21. Today is Tuesday. What day will it be in 10 days? JQRNZW

( ) Thursday ( ) Friday ( ) Wednesday ( ) Saturday

working

22. Today is Tuesday. What day was it 13 days AGO? 2U78TL

( ) Monday ( ) Wednesday ( ) Thursday ( ) Tuesday

working

23. Today is Friday. What day will it be in 20 days? EAVPD4

( ) Friday ( ) Thursday ( ) Wednesday ( ) Sunday

working

24. Today is Sunday. What day was it 13 days AGO? 7YVFWM

( ) Sunday ( ) Monday ( ) Tuesday ( ) Saturday

working

25. Today is Tuesday. What day will it be in 20 days? 63J68M

( ) Monday ( ) Sunday ( ) Thursday ( ) Tuesday

working

26. Today is Wednesday. What day was it 20 days AGO? NAWQS8

( ) Wednesday ( ) Thursday ( ) Tuesday ( ) Friday

working

27. Today is Sunday. What day will it be in 100 days? 2W8SAC

( ) Wednesday ( ) Monday ( ) Tuesday ( ) Sunday

working

28. Today is Wednesday. What day was it 13 days AGO? 7BUHLU

( ) Tuesday ( ) Friday ( ) Thursday ( ) Wednesday

working

29. Today is Thursday. What day will it be in 30 days? LPE9GF

( ) Sunday ( ) Friday ( ) Saturday ( ) Monday

working

30. Today is Wednesday. What day was it 9 days AGO? 8NJKPA

( ) Friday ( ) Tuesday ( ) Monday ( ) Sunday

working

Chapter 6 — Answers: Days of the week

1. Monday

100 / 7 = 14 weeks and 2 days left over. 14 weeks lands on Saturday again, then 2 more days gives Monday.

2. Monday

20 / 7 = 2 weeks and 6 days left over. Going back 2 weeks lands on Sunday again, then 6 days further back gives Monday.

3. Friday

30 / 7 = 4 weeks and 2 days left over. 4 weeks lands on Wednesday again, then 2 more days gives Friday.

4. Friday

16 / 7 = 2 weeks and 2 days left over. Going back 2 weeks lands on Sunday again, then 2 days further back gives Friday.

5. Saturday

12 / 7 = 1 week and 5 days left over. 1 week lands on Monday again, then 5 more days gives Saturday.

6. Thursday

16 / 7 = 2 weeks and 2 days left over. Going back 2 weeks lands on Saturday again, then 2 days further back gives Thursday.

7. Tuesday

30 / 7 = 4 weeks and 2 days left over. 4 weeks lands on Sunday again, then 2 more days gives Tuesday.

8. Tuesday

20 / 7 = 2 weeks and 6 days left over. Going back 2 weeks lands on Monday again, then 6 days further back gives Tuesday.

9. Tuesday

20 / 7 = 2 weeks and 6 days left over. 2 weeks lands on Wednesday again, then 6 more days gives Tuesday.

10. Monday

30 / 7 = 4 weeks and 2 days left over. Going back 4 weeks lands on Wednesday again, then 2 days further back gives Monday.

11. Tuesday

12 / 7 = 1 week and 5 days left over. 1 week lands on Thursday again, then 5 more days gives Tuesday.

12. Saturday

16 / 7 = 2 weeks and 2 days left over. Going back 2 weeks lands on Monday again, then 2 days further back gives Saturday.

13. Sunday

100 / 7 = 14 weeks and 2 days left over. 14 weeks lands on Friday again, then 2 more days gives Sunday.

14. Sunday

23 / 7 = 3 weeks and 2 days left over. Going back 3 weeks lands on Tuesday again, then 2 days further back gives Sunday.

15. Wednesday

20 / 7 = 2 weeks and 6 days left over. 2 weeks lands on Thursday again, then 6 more days gives Wednesday.

16. Wednesday

30 / 7 = 4 weeks and 2 days left over. Going back 4 weeks lands on Friday again, then 2 days further back gives Wednesday.

17. Sunday

20 / 7 = 2 weeks and 6 days left over. 2 weeks lands on Monday again, then 6 more days gives Sunday.

18. Friday

30 / 7 = 4 weeks and 2 days left over. Going back 4 weeks lands on Sunday again, then 2 days further back gives Friday.

19. Thursday

100 / 7 = 14 weeks and 2 days left over. 14 weeks lands on Tuesday again, then 2 more days gives Thursday.

20. Monday

16 / 7 = 2 weeks and 2 days left over. Going back 2 weeks lands on Wednesday again, then 2 days further back gives Monday.

21. Friday

10 / 7 = 1 week and 3 days left over. 1 week lands on Tuesday again, then 3 more days gives Friday.

22. Wednesday

13 / 7 = 1 week and 6 days left over. Going back 1 week lands on Tuesday again, then 6 days further back gives Wednesday.

23. Thursday

20 / 7 = 2 weeks and 6 days left over. 2 weeks lands on Friday again, then 6 more days gives Thursday.

24. Monday

13 / 7 = 1 week and 6 days left over. Going back 1 week lands on Sunday again, then 6 days further back gives Monday.

25. Monday

20 / 7 = 2 weeks and 6 days left over. 2 weeks lands on Tuesday again, then 6 more days gives Monday.

26. Thursday

20 / 7 = 2 weeks and 6 days left over. Going back 2 weeks lands on Wednesday again, then 6 days further back gives Thursday.

27. Tuesday

100 / 7 = 14 weeks and 2 days left over. 14 weeks lands on Sunday again, then 2 more days gives Tuesday.

28. Thursday

13 / 7 = 1 week and 6 days left over. Going back 1 week lands on Wednesday again, then 6 days further back gives Thursday.

29. Saturday

30 / 7 = 4 weeks and 2 days left over. 4 weeks lands on Thursday again, then 2 more days gives Saturday.

30. Monday

9 / 7 = 1 week and 2 days left over. Going back 1 week lands on Wednesday again, then 2 days further back gives Monday.

Balancing scales



IN PLAIN WORDS

If several identical things balance some balls, first work out what ONE thing is worth.

EXAMPLE

3 boxes balance 12 balls, so 1 box = 4 balls. Then 5 boxes = 20 balls.

COMMON ERROR

Adding one ball when one more BOX is added. One extra box is worth a whole box, not one ball.

REMEMBER IT LIKE THIS

Swapping money: find what one coin is worth before you count the pile.

CHECK YOURSELF

4 bags balance 20 marbles. How many marbles balance 6 bags? (answer: 30)

1. 2 crates balance exactly 10 bricks. All crates weigh the same and all bricks weigh the same. How many bricks balance 3 crates? DJ73VY

( ) 11 ( ) 10 ( ) 15 ( ) 20

working

2. 5 boxes balance exactly 15 balls. How many boxes would balance 9 balls? 7L3FZL

( ) 5 ( ) 3 ( ) 9 ( ) 4

working

3. 5 tins balance exactly 35 cubes. All tins weigh the same and all cubes weigh the same. How many cubes balance 9 tins? 6L9R2N

( ) 70 ( ) 39 ( ) 35 ( ) 63

working

4. 3 jars balance exactly 12 coins. How many jars would balance 36 coins? JU3SQ6

( ) 10 ( ) 36 ( ) 3 ( ) 9

working

5. 2 bags balance exactly 18 marbles. All bags weigh the same and all marbles weigh the same. How many marbles balance 5 bags? QH9ZE7

( ) 45 ( ) 18 ( ) 54 ( ) 21

working

6. 3 tins balance exactly 6 cubes. How many tins would balance 8 cubes? THM8B6

( ) 3 ( ) 5 ( ) 8 ( ) 4

working

7. 4 pots balance exactly 12 pebbles. All pots weigh the same and all pebbles weigh the same. How many pebbles balance 9 pots? C3GVDH

( ) 12 ( ) 17 ( ) 30 ( ) 27

working

8. 6 jars balance exactly 24 coins. How many jars would balance 36 coins? AJHFA5

( ) 36 ( ) 6 ( ) 9 ( ) 10

working

9. 3 boxes balance exactly 27 balls. All boxes weigh the same and all balls weigh the same. How many balls balance 7 boxes? 53K3NJ

( ) 72 ( ) 31 ( ) 63 ( ) 27

working

10. 2 tins balance exactly 12 cubes. How many tins would balance 30 cubes? RMNTVH

( ) 5 ( ) 2 ( ) 30 ( ) 6

working

11. 6 pots balance exactly 24 pebbles. All pots weigh the same and all pebbles weigh the same. How many pebbles balance 4 pots? HQP32U

( ) 24 ( ) 22 ( ) 20 ( ) 16

working

12. 3 bags balance exactly 18 marbles. How many bags would balance 48 marbles? 87ANZT

( ) 48 ( ) 8 ( ) 3 ( ) 9

working

13. 3 pots balance exactly 24 pebbles. All pots weigh the same and all pebbles weigh the same. How many pebbles balance 7 pots? 8SYB7F

( ) 56 ( ) 24 ( ) 28 ( ) 64

working

14. 2 bags balance exactly 6 marbles. How many bags would balance 18 marbles? WXEMGQ

( ) 18 ( ) 6 ( ) 7 ( ) 2

working

15. 2 boxes balance exactly 4 balls. All boxes weigh the same and all balls weigh the same. How many balls balance 4 boxes? 2S667A

( ) 4 ( ) 8 ( ) 6 ( ) 10

working

16. 5 bags balance exactly 40 marbles. How many bags would balance 64 marbles? FVKWT4

( ) 9 ( ) 8 ( ) 64 ( ) 5

working

17. 2 crates balance exactly 4 bricks. All crates weigh the same and all bricks weigh the same. How many bricks balance 4 crates? X5SBJ5

( ) 6 ( ) 4 ( ) 8 ( ) 10

working

18. 2 boxes balance exactly 16 balls. How many boxes would balance 72 balls? 3Q46RL

( ) 2 ( ) 72 ( ) 10 ( ) 9

working

19. 2 jars balance exactly 14 coins. All jars weigh the same and all coins weigh the same. How many coins balance 5 jars? UG2FD7

( ) 35 ( ) 14 ( ) 42 ( ) 17

working

20. 4 tins balance exactly 12 cubes. How many tins would balance 24 cubes? PENU2V

( ) 9 ( ) 4 ( ) 8 ( ) 24

working

21. 6 boxes balance exactly 54 balls. All boxes weigh the same and all balls weigh the same. How many balls balance 9 boxes? YTFYQE

( ) 57 ( ) 54 ( ) 90 ( ) 81

working

22. 5 boxes balance exactly 35 balls. How many boxes would balance 14 balls? JXQ5SY

( ) 14 ( ) 3 ( ) 5 ( ) 2

working

23. 5 boxes balance exactly 20 balls. All boxes weigh the same and all balls weigh the same. How many balls balance 8 boxes? CB9YM6

( ) 36 ( ) 20 ( ) 23 ( ) 32

working

24. 2 boxes balance exactly 16 balls. How many boxes would balance 48 balls? XUD7DA

( ) 48 ( ) 2 ( ) 6 ( ) 7

working

25. 2 jars balance exactly 18 coins. All jars weigh the same and all coins weigh the same. How many coins balance 4 jars? VXGVA3

( ) 36 ( ) 20 ( ) 45 ( ) 18

working

26. 3 bags balance exactly 6 marbles. How many bags would balance 18 marbles? BG2TCV

( ) 9 ( ) 10 ( ) 18 ( ) 3

working

27. 6 crates balance exactly 36 bricks. All crates weigh the same and all bricks weigh the same. How many bricks balance 9 crates? DNNGFP

( ) 39 ( ) 36 ( ) 54 ( ) 60

working

28. 3 tins balance exactly 15 cubes. How many tins would balance 45 cubes? N378HZ

( ) 9 ( ) 45 ( ) 3 ( ) 10

working

29. 2 jars balance exactly 18 coins. All jars weigh the same and all coins weigh the same. How many coins balance 9 jars? NFQQS9

( ) 90 ( ) 25 ( ) 18 ( ) 81

working

30. 5 tins balance exactly 45 cubes. How many tins would balance 72 cubes? X5U52Z

( ) 8 ( ) 5 ( ) 72 ( ) 9

working

Chapter 7 — Answers: Balancing scales

1. **15**

2 crates = 10 bricks, so 1 crate = 10 / 2 = 5 bricks. 3 crates = 3 x 5 = 15 bricks.

2. **3**

1 box = 15 / 5 = 3 balls. 9 / 3 = 3 boxes.

3. **63**

5 tins = 35 cubes, so 1 tin = 35 / 5 = 7 cubes. 9 tins = 9 x 7 = 63 cubes.

4. **9**

1 jar = 12 / 3 = 4 coins. 36 / 4 = 9 jars.

5. **45**

2 bags = 18 marbles, so 1 bag = 18 / 2 = 9 marbles. 5 bags = 5 x 9 = 45 marbles.

6. **4**

1 tin = 6 / 3 = 2 cubes. 8 / 2 = 4 tins.

7. **27**

4 pots = 12 pebbles, so 1 pot = 12 / 4 = 3 pebbles. 9 pots = 9 x 3 = 27 pebbles.

8. **9**

1 jar = 24 / 6 = 4 coins. 36 / 4 = 9 jars.

9. **63**

3 boxes = 27 balls, so 1 box = 27 / 3 = 9 balls. 7 boxes = 7 x 9 = 63 balls.

10. **5**

1 tin = 12 / 2 = 6 cubes. 30 / 6 = 5 tins.

11. **16**

6 pots = 24 pebbles, so 1 pot = 24 / 6 = 4 pebbles. 4 pots = 4 x 4 = 16 pebbles.

12. **8**

1 bag = 18 / 3 = 6 marbles. 48 / 6 = 8 bags.

13. **56**

3 pots = 24 pebbles, so 1 pot = 24 / 3 = 8 pebbles. 7 pots = 7 x 8 = 56 pebbles.

14. **6**

1 bag = 6 / 2 = 3 marbles. 18 / 3 = 6 bags.

15. **8**

2 boxes = 4 balls, so 1 box = 4 / 2 = 2 balls. 4 boxes = 4 x 2 = 8 balls.

16. **8**

1 bag = 40 / 5 = 8 marbles. 64 / 8 = 8 bags.

17. **8**

2 crates = 4 bricks, so 1 crate = 4 / 2 = 2 bricks. 4 crates = 4 x 2 = 8 bricks.

18. **9**

1 box = 16 / 2 = 8 balls. 72 / 8 = 9 boxes.

19. **35**

2 jars = 14 coins, so 1 jar = 14 / 2 = 7 coins. 5 jars = 5 x 7 = 35 coins.

20. **8**

1 tin = 12 / 4 = 3 cubes. 24 / 3 = 8 tins.

21. **81**

6 boxes = 54 balls, so 1 box = 54 / 6 = 9 balls. 9 boxes = 9 x 9 = 81 balls.

22. **2**

1 box = 35 / 5 = 7 balls. 14 / 7 = 2 boxes.

23. **32**

5 boxes = 20 balls, so 1 box = 20 / 5 = 4 balls. 8 boxes = 8 x 4 = 32 balls.

24. **6**

1 box = 16 / 2 = 8 balls. 48 / 8 = 6 boxes.

25. **36**

2 jars = 18 coins, so 1 jar = 18 / 2 = 9 coins. 4 jars = 4 x 9 = 36 coins.

26. **9**

1 bag = 6 / 3 = 2 marbles. 18 / 2 = 9 bags.

27. **54**

6 crates = 36 bricks, so 1 crate = 36 / 6 = 6 bricks. 9 crates = 9 x 6 = 54 bricks.

28. **9**

1 tin = 15 / 3 = 5 cubes. 45 / 5 = 9 tins.

29. **81**

2 jars = 18 coins, so 1 jar = 18 / 2 = 9 coins. 9 jars = 9 x 9 = 81 coins.

30. **8**

1 tin = 45 / 5 = 9 cubes. 72 / 9 = 8 tins.

Ruling things out



IN PLAIN WORDS

In these puzzles each person owns exactly one thing and no two people own the same thing. Once you know that, a clue saying what someone does NOT have is just as useful as one saying what they do.

EXAMPLE

If Sam has neither the cat nor the dog, and there are only three pets, Sam has the third one. You did not need to be told directly.

> COMMON ERROR
>
> Waiting for a clue that names the answer. Often no such clue exists - the answer is whatever is left standing.

REMEMBER IT LIKE THIS

Crossing names off a list. The last name left is the answer.

CHECK YOURSELF

Three pets, three children. If A has not got the cat or dog, what has A got? (answer: the third pet)

1. Between them, Ivy, Ella and Eli own exactly one bird, one cat and one dog. Each child owns a different pet. Ivy does not own the cat or the dog. Ella does not own the dog. What pet does Eli own? NQMCBV

( ) dog ( ) cat ( ) cannot be decided ( ) bird

working

2. Between them, Ella, Finn and Mia own exactly one cat, one rabbit and one dog. Each child owns a different pet. Ella does not own the rabbit or the dog. Finn does not own the dog. What pet does Mia own? HAX3MT

( ) dog ( ) cannot be decided ( ) cat ( ) rabbit

working

3. Between them, Ruby, Mia and Noah own exactly one fish, one cat and one bird. Each child owns a different pet. Ruby does not own the cat or the bird. Mia does not own the bird. What pet does Noah own? XRFBHY

( ) cannot be decided ( ) bird ( ) fish ( ) cat

working

4. Between them, Ivy, Owen and Zoe own exactly one fish, one rabbit and one dog. Each child owns a different pet. Ivy does not own the rabbit or the dog. Owen does not own the dog. What pet does Zoe own? WAZF8Z

( ) dog ( ) fish ( ) cannot be decided ( ) rabbit

working

5. Between them, Ava, Leo and Mila own exactly one cat, one fish and one bird. Each child owns a different pet. Ava does not own the fish or the bird. Leo does not own the bird. What pet does Mila own? BVL6VS

( ) fish ( ) cannot be decided ( ) bird ( ) cat

working

6. Between them, Ella, Mia and Max own exactly one fish, one bird and one rabbit. Each child owns a different pet. Ella does not own the bird or the rabbit. Mia does not own the rabbit. What pet does Max own? LAJXX3

( ) cannot be decided ( ) rabbit ( ) bird ( ) fish

working

7. Between them, Sam, Eli and Hugo own exactly one bird, one rabbit and one cat. Each child owns a different pet. Sam does not own the rabbit or the cat. Eli does not own the cat. What pet does Hugo own? L6JQDN

( ) rabbit ( ) cat ( ) bird ( ) cannot be decided

working

8. Between them, Mia, Mila and Jack own exactly one fish, one cat and one bird. Each child owns a different pet. Mia does not own the cat or the bird. Mila does not own the bird. What pet does Jack own? RHGAAA

( ) bird ( ) cannot be decided ( ) cat ( ) fish

working

9. Between them, Lily, Kai and Grace own exactly one dog, one rabbit and one cat. Each child owns a different pet. Lily does not own the rabbit or the cat. Kai does not own the cat. What pet does Grace own? S729Y5

( ) dog ( ) cat ( ) cannot be decided ( ) rabbit

working

10. Between them, Jack, Eli and Hugo own exactly one fish, one dog and one bird. Each child owns a different pet. Jack does not own the dog or the bird. Eli does not own the bird. What pet does Hugo own? TVKLE8

( ) fish ( ) bird ( ) dog ( ) cannot be decided

working

11. Between them, Finn, Hugo and Ella own exactly one fish, one bird and one dog. Each child owns a different pet. Finn does not own the bird or the dog. Hugo does not own the dog. What pet does Ella own? BFT5MY

( ) fish ( ) bird ( ) dog ( ) cannot be decided

working

12. Between them, Lily, Nina and Finn own exactly one dog, one rabbit and one bird. Each child owns a different pet. Lily does not own the rabbit or the bird. Nina does not own the bird. What pet does Finn own? ZPDPPW

( ) rabbit ( ) bird ( ) dog ( ) cannot be decided

working

13. Between them, Ava, Nina and Noah own exactly one fish, one dog and one rabbit. Each child owns a different pet. Ava does not own the dog or the rabbit. Nina does not own the rabbit. What pet does Noah own? BUTN3T

( ) dog ( ) fish ( ) rabbit ( ) cannot be decided

working

14. Between them, Kai, Sam and Nina own exactly one dog, one fish and one cat. Each child owns a different pet. Kai does not own the fish or the cat. Sam does not own the cat. What pet does Nina own? 3GX8NJ

( ) fish ( ) dog ( ) cannot be decided ( ) cat

working

15. Between them, Finn, Mia and Ivy own exactly one cat, one rabbit and one fish. Each child owns a different pet. Finn does not own the rabbit or the fish. Mia does not own the fish. What pet does Ivy own? 8WYHA3

( ) cannot be decided ( ) rabbit ( ) cat ( ) fish

working

16. Between them, Sam, Mia and Eli own exactly one rabbit, one bird and one dog. Each child owns a different pet. Sam does not own the bird or the dog. Mia does not own the dog. What pet does Eli own? 5ZSKBU

( ) dog ( ) rabbit ( ) cannot be decided ( ) bird

working

17. Between them, Mila, Zoe and Noah own exactly one rabbit, one cat and one fish. Each child owns a different pet. Mila does not own the cat or the fish. Zoe does not own the fish. What pet does Noah own? P6Q9NY

( ) fish ( ) cannot be decided ( ) rabbit ( ) cat

working

18. Between them, Noah, Mia and Max own exactly one rabbit, one fish and one bird. Each child owns a different pet. Noah does not own the fish or the bird. Mia does not own the bird. What pet does Max own? UMX5AM

( ) cannot be decided ( ) rabbit ( ) bird ( ) fish

working

19. Between them, Lily, Jack and Sam own exactly one cat, one rabbit and one fish. Each child owns a different pet. Lily does not own the rabbit or the fish. Jack does not own the fish. What pet does Sam own? NF9TZ3

( ) cannot be decided ( ) fish ( ) cat ( ) rabbit

working

20. Between them, Hugo, Grace and Ella own exactly one fish, one rabbit and one cat. Each child owns a different pet. Hugo does not own the rabbit or the cat. Grace does not own the cat. What pet does Ella own? QAEQXA

( ) rabbit ( ) cat ( ) fish ( ) cannot be decided

working

21. Between them, Ava, Mila and Noah own exactly one rabbit, one bird and one cat. Each child owns a different pet. Ava does not own the bird or the cat. Mila does not own the cat. What pet does Noah own? RTVUFY

( ) rabbit ( ) bird ( ) cannot be decided ( ) cat

working

22. Between them, Sam, Ava and Jack own exactly one rabbit, one fish and one dog. Each child owns a different pet. Sam does not own the fish or the dog. Ava does not own the dog. What pet does Jack own? 3643RM

( ) cannot be decided ( ) fish ( ) rabbit ( ) dog

working

23. Between them, Lily, Mia and Sam own exactly one bird, one cat and one rabbit. Each child owns a different pet. Lily does not own the cat or the rabbit. Mia does not own the rabbit. What pet does Sam own? AVQK2M

( ) bird ( ) cat ( ) rabbit ( ) cannot be decided

working

24. Between them, Kai, Max and Lily own exactly one dog, one cat and one rabbit. Each child owns a different pet. Kai does not own the cat or the rabbit. Max does not own the rabbit. What pet does Lily own? MXYC2V

( ) cannot be decided ( ) cat ( ) rabbit ( ) dog

working

25. Between them, Ivy, Leo and Noah own exactly one rabbit, one fish and one dog. Each child owns a different pet. Ivy does not own the fish or the dog. Leo does not own the dog. What pet does Noah own? MTMQXW

( ) rabbit ( ) dog ( ) cannot be decided ( ) fish

working

26. Between them, Kai, Zoe and Mia own exactly one dog, one fish and one cat. Each child owns a different pet. Kai does not own the fish or the cat. Zoe does not own the cat. What pet does Mia own? HBC9V2

( ) dog ( ) cannot be decided ( ) fish ( ) cat

working

27. Between them, Ava, Sam and Jack own exactly one cat, one rabbit and one bird. Each child owns a different pet. Ava does not own the rabbit or the bird. Sam does not own the bird. What pet does Jack own? W7QGM4

( ) cannot be decided ( ) bird ( ) cat ( ) rabbit

working

28. Between them, Ava, Zoe and Jack own exactly one rabbit, one dog and one cat. Each child owns a different pet. Ava does not own the dog or the cat. Zoe does not own the cat. What pet does Jack own? 65KZ44

( ) dog ( ) rabbit ( ) cat ( ) cannot be decided

working

29. Between them, Jack, Max and Nina own exactly one bird, one dog and one rabbit. Each child owns a different pet. Jack does not own the dog or the rabbit. Max does not own the rabbit. What pet does Nina own? FQSTPJ

( ) dog ( ) bird ( ) rabbit ( ) cannot be decided

working

30. Between them, Nina, Ruby and Noah own exactly one fish, one dog and one cat. Each child owns a different pet. Nina does not own the dog or the cat. Ruby does not own the cat. What pet does Noah own? BP2Q2K

( ) cannot be decided ( ) cat ( ) fish ( ) dog

working

Chapter 8 — Answers: Ruling things out

1. dog

Ivy cannot have the cat or the dog, so Ivy has the bird. Ella cannot have the dog, and the bird is taken, so Ella has the cat. That leaves the dog for Eli.

2. dog

Ella cannot have the rabbit or the dog, so Ella has the cat. Finn cannot have the dog, and the cat is taken, so Finn has the rabbit. That leaves the dog for Mia.

3. bird

Ruby cannot have the cat or the bird, so Ruby has the fish. Mia cannot have the bird, and the fish is taken, so Mia has the cat. That leaves the bird for Noah.

4. dog

Ivy cannot have the rabbit or the dog, so Ivy has the fish. Owen cannot have the dog, and the fish is taken, so Owen has the rabbit. That leaves the dog for Zoe.

5. bird

Ava cannot have the fish or the bird, so Ava has the cat. Leo cannot have the bird, and the cat is taken, so Leo has the fish. That leaves the bird for Mila.

6. rabbit

Ella cannot have the bird or the rabbit, so Ella has the fish. Mia cannot have the rabbit, and the fish is taken, so Mia has the bird. That leaves the rabbit for Max.

7. cat

Sam cannot have the rabbit or the cat, so Sam has the bird. Eli cannot have the cat, and the bird is taken, so Eli has the rabbit. That leaves the cat for Hugo.

8. bird

Mia cannot have the cat or the bird, so Mia has the fish. Mila cannot have the bird, and the fish is taken, so Mila has the cat. That leaves the bird for Jack.

9. cat

Lily cannot have the rabbit or the cat, so Lily has the dog. Kai cannot have the cat, and the dog is taken, so Kai has the rabbit. That leaves the cat for Grace.

10. bird

Jack cannot have the dog or the bird, so Jack has the fish. Eli cannot have the bird, and the fish is taken, so Eli has the dog. That leaves the bird for Hugo.

11. dog

Finn cannot have the bird or the dog, so Finn has the fish. Hugo cannot have the dog, and the fish is taken, so Hugo has the bird. That leaves the dog for Ella.

12. bird

Lily cannot have the rabbit or the bird, so Lily has the dog. Nina cannot have the bird, and the dog is taken, so Nina has the rabbit. That leaves the bird for Finn.

13. rabbit

Ava cannot have the dog or the rabbit, so Ava has the fish. Nina cannot have the rabbit, and the fish is taken, so Nina has the dog. That leaves the rabbit for Noah.

14. cat

Kai cannot have the fish or the cat, so Kai has the dog. Sam cannot have the cat, and the dog is taken, so Sam has the fish. That leaves the cat for Nina.

15. fish

Finn cannot have the rabbit or the fish, so Finn has the cat. Mia cannot have the fish, and the cat is taken, so Mia has the rabbit. That leaves the fish for Ivy.

16. dog

Sam cannot have the bird or the dog, so Sam has the rabbit. Mia cannot have the dog, and the rabbit is taken, so Mia has the bird. That leaves the dog for Eli.

17. fish

Mila cannot have the cat or the fish, so Mila has the rabbit. Zoe cannot have the fish, and the rabbit is taken, so Zoe has the cat. That leaves the fish for Noah.

18. bird

Noah cannot have the fish or the bird, so Noah has the rabbit. Mia cannot have the bird, and the rabbit is taken, so Mia has the fish. That leaves the bird for Max.

19. fish

Lily cannot have the rabbit or the fish, so Lily has the cat. Jack cannot have the fish, and the cat is taken, so Jack has the rabbit. That leaves the fish for Sam.

20. cat

Hugo cannot have the rabbit or the cat, so Hugo has the fish. Grace cannot have the cat, and the fish is taken, so Grace has the rabbit. That leaves the cat for Ella.

21. cat

Ava cannot have the bird or the cat, so Ava has the rabbit. Mila cannot have the cat, and the rabbit is taken, so Mila has the bird. That leaves the cat for Noah.

22. dog

Sam cannot have the fish or the dog, so Sam has the rabbit. Ava cannot have the dog, and the rabbit is taken, so Ava has the fish. That leaves the dog for Jack.

23. rabbit

Lily cannot have the cat or the rabbit, so Lily has the bird. Mia cannot have the rabbit, and the bird is taken, so Mia has the cat. That leaves the rabbit for Sam.

24. rabbit

Kai cannot have the cat or the rabbit, so Kai has the dog. Max cannot have the rabbit, and the dog is taken, so Max has the cat. That leaves the rabbit for Lily.

25. dog

Ivy cannot have the fish or the dog, so Ivy has the rabbit. Leo cannot have the dog, and the rabbit is taken, so Leo has the fish. That leaves the dog for Noah.

26. cat

Kai cannot have the fish or the cat, so Kai has the dog. Zoe cannot have the cat, and the dog is taken, so Zoe has the fish. That leaves the cat for Mia.

27. bird

Ava cannot have the rabbit or the bird, so Ava has the cat. Sam cannot have the bird, and the cat is taken, so Sam has the rabbit. That leaves the bird for Jack.

28. cat

Ava cannot have the dog or the cat, so Ava has the rabbit. Zoe cannot have the cat, and the rabbit is taken, so Zoe has the dog. That leaves the cat for Jack.

29. rabbit

Jack cannot have the dog or the rabbit, so Jack has the bird. Max cannot have the rabbit, and the bird is taken, so Max has the dog. That leaves the rabbit for Nina.

30. cat

Nina cannot have the dog or the cat, so Nina has the fish. Ruby cannot have the cat, and the fish is taken, so Ruby has the dog. That leaves the cat for Noah.

Finding the rule



IN PLAIN WORDS

A machine question gives you input and output pairs. Find the rule that works for EVERY pair, not just the first one.

EXAMPLE

2 becomes 7, 5 becomes 16. Try ‘times 3 add 1’: 2x3+1 = 7, 5x3+1 = 16. Both fit, so that is the rule.

> COMMON ERROR
>
> Finding a rule that fits the first pair and stopping. ‘Add 5’ fits 2 to 7 but fails on 5 to 16.

REMEMBER IT LIKE THIS

A recipe has to work every time you cook, not just once.

CHECK YOURSELF

1 becomes 6, 3 becomes 14. What is the rule? (answer: times 4, add 2)

1. A machine multiplies by the same whole number and then adds the same whole number, every time. 3 becomes 21; 2 becomes 17; 9 becomes 45. What does 8 become? 2PXC8C

( ) 45 ( ) 41 ( ) 32 ( ) 17

working

2. A machine multiplies by the same whole number and then adds the same whole number, every time. 1 becomes 11; 10 becomes 29; 5 becomes 19. Which number becomes 23? PR8DX7

( ) 11 ( ) 7 ( ) 14 ( ) 8

working

3. A machine multiplies by the same whole number and then adds the same whole number, every time. 10 becomes 31; 2 becomes 7; 7 becomes 22. What does 4 become? SE2X8R

( ) 5 ( ) 12 ( ) 13 ( ) 16

working

4. A machine multiplies by the same whole number and then adds the same whole number, every time. 5 becomes 17; 6 becomes 19; 2 becomes 11. Which number becomes 23? THSFVX

( ) 9 ( ) 16 ( ) 11 ( ) 8

working

5. A machine multiplies by the same whole number and then adds the same whole number, every time. 7 becomes 32; 2 becomes 12; 10 becomes 44. What does 11 become? G8TAM8

( ) 44 ( ) 48 ( ) 52 ( ) 15

working

6. A machine multiplies by the same whole number and then adds the same whole number, every time. 10 becomes 38; 1 becomes 11; 5 becomes 23. Which number becomes 20? UCUN3G

( ) 4 ( ) 6 ( ) 12 ( ) 5

working

7. A machine multiplies by the same whole number and then adds the same whole number, every time. 11 becomes 47; 1 becomes 7; 4 becomes 19. What does 3 become? Z7RYPP

( ) 19 ( ) 12 ( ) 15 ( ) 6

working

8. A machine multiplies by the same whole number and then adds the same whole number, every time. 6 becomes 19; 5 becomes 17; 2 becomes 11. Which number becomes 35? AR96V3

( ) 15 ( ) 14 ( ) 28 ( ) 17

working

9. A machine multiplies by the same whole number and then adds the same whole number, every time. 2 becomes 9; 6 becomes 21; 3 becomes 12. What does 13 become? F2HF2C

( ) 16 ( ) 39 ( ) 42 ( ) 45

working

10. A machine multiplies by the same whole number and then adds the same whole number, every time. 9 becomes 24; 11 becomes 28; 6 becomes 18. Which number becomes 30? AFVZBA

( ) 15 ( ) 12 ( ) 13 ( ) 24

working

11. A machine multiplies by the same whole number and then adds the same whole number, every time. 6 becomes 25; 11 becomes 40; 8 becomes 31. What does 13 become? 5DC2UL

( ) 49 ( ) 20 ( ) 39 ( ) 46

working

12. A machine multiplies by the same whole number and then adds the same whole number, every time. 4 becomes 15; 11 becomes 29; 7 becomes 21. Which number becomes 23? 27M6UC

( ) 8 ( ) 11 ( ) 16 ( ) 9

working

13. A machine multiplies by the same whole number and then adds the same whole number, every time. 10 becomes 37; 3 becomes 16; 2 becomes 13. What does 11 become? AGNLJF

( ) 40 ( ) 33 ( ) 18 ( ) 43

working

14. A machine multiplies by the same whole number and then adds the same whole number, every time. 5 becomes 15; 1 becomes 7; 6 becomes 17. Which number becomes 21? HQBY4M

( ) 10 ( ) 16 ( ) 9 ( ) 8

working

15. A machine multiplies by the same whole number and then adds the same whole number, every time. 7 becomes 23; 5 becomes 19; 4 becomes 17. What does 14 become? R7KKTG

( ) 28 ( ) 39 ( ) 37 ( ) 23

working

16. A machine multiplies by the same whole number and then adds the same whole number, every time. 5 becomes 14; 10 becomes 24; 7 becomes 18. Which number becomes 26? TBMYER

( ) 11 ( ) 12 ( ) 13 ( ) 22

working

17. A machine multiplies by the same whole number and then adds the same whole number, every time. 8 becomes 24; 9 becomes 26; 1 becomes 10. What does 2 become? P26B5T

( ) 10 ( ) 12 ( ) 4 ( ) 14

working

18. A machine multiplies by the same whole number and then adds the same whole number, every time. 1 becomes 8; 9 becomes 24; 3 becomes 12. Which number becomes 26? 32VDSA

( ) 20 ( ) 11 ( ) 13 ( ) 10

working

19. A machine multiplies by the same whole number and then adds the same whole number, every time. 6 becomes 31; 11 becomes 51; 9 becomes 43. What does 13 become? 87GPEA

( ) 20 ( ) 59 ( ) 63 ( ) 52

working

20. A machine multiplies by the same whole number and then adds the same whole number, every time. 9 becomes 25; 8 becomes 23; 11 becomes 29. Which number becomes 31? 4W5GC9

( ) 13 ( ) 15 ( ) 12 ( ) 24

working

21. A machine multiplies by the same whole number and then adds the same whole number, every time. 3 becomes 13; 11 becomes 45; 8 becomes 33. What does 9 become? 2M8L2L

( ) 36 ( ) 37 ( ) 10 ( ) 41

working

22. A machine multiplies by the same whole number and then adds the same whole number, every time. 9 becomes 22; 2 becomes 8; 11 becomes 26. Which number becomes 24? ZU8RLN

( ) 10 ( ) 11 ( ) 20 ( ) 12

working

23. A machine multiplies by the same whole number and then adds the same whole number, every time. 11 becomes 35; 8 becomes 26; 10 becomes 32. What does 6 become? 8XGGAW

( ) 23 ( ) 18 ( ) 8 ( ) 20

working

24. A machine multiplies by the same whole number and then adds the same whole number, every time. 7 becomes 20; 10 becomes 26; 1 becomes 8. Which number becomes 16? 9A34YH

( ) 10 ( ) 8 ( ) 5 ( ) 6

working

25. A machine multiplies by the same whole number and then adds the same whole number, every time. 9 becomes 35; 3 becomes 17; 4 becomes 20. What does 6 become? 3GQPS8

( ) 29 ( ) 14 ( ) 18 ( ) 26

working

26. A machine multiplies by the same whole number and then adds the same whole number, every time. 11 becomes 27; 6 becomes 17; 8 becomes 21. Which number becomes 11? RCZCYG

( ) 3 ( ) 4 ( ) 6 ( ) 5

working

27. A machine multiplies by the same whole number and then adds the same whole number, every time. 8 becomes 17; 11 becomes 23; 5 becomes 11. What does 13 become? 7BLX94

( ) 29 ( ) 26 ( ) 14 ( ) 27

working

28. A machine multiplies by the same whole number and then adds the same whole number, every time. 8 becomes 33; 6 becomes 27; 9 becomes 36. Which number becomes 24? SAVS4B

( ) 8 ( ) 6 ( ) 5 ( ) 15

working

29. A machine multiplies by the same whole number and then adds the same whole number, every time. 3 becomes 16; 4 becomes 20; 7 becomes 32. What does 8 become? TYD59H

( ) 40 ( ) 12 ( ) 32 ( ) 36

working

30. A machine multiplies by the same whole number and then adds the same whole number, every time. 7 becomes 22; 9 becomes 26; 11 becomes 30. Which number becomes 14? 8KMXVA

( ) 7 ( ) 6 ( ) 3 ( ) 4

working

Chapter 9 — Answers: Finding the rule

1. **41**

Each number is multiplied by 4 then 9 is added. 8 x 4 = 32, + 9 = 41.

2. **7**

The rule is ‘multiply by 2, then add 9’. Undo it: 23 - 9 = 14, then 14 / 2 = 7.

3. **13**

Each number is multiplied by 3 then 1 is added. 4 x 3 = 12, + 1 = 13.

4. **8**

The rule is ‘multiply by 2, then add 7’. Undo it: 23 - 7 = 16, then 16 / 2 = 8.

5. **48**

Each number is multiplied by 4 then 4 is added. 11 x 4 = 44, + 4 = 48.

6. **4**

The rule is ‘multiply by 3, then add 8’. Undo it: 20 - 8 = 12, then 12 / 3 = 4.

7. **15**

Each number is multiplied by 4 then 3 is added. 3 x 4 = 12, + 3 = 15.

8. **14**

The rule is ‘multiply by 2, then add 7’. Undo it: 35 - 7 = 28, then 28 / 2 = 14.

9. **42**

Each number is multiplied by 3 then 3 is added. 13 x 3 = 39, + 3 = 42.

10. **12**

The rule is ‘multiply by 2, then add 6’. Undo it: 30 - 6 = 24, then 24 / 2 = 12.

11. **46**

Each number is multiplied by 3 then 7 is added. 13 x 3 = 39, + 7 = 46.

12. **8**

The rule is ‘multiply by 2, then add 7’. Undo it: 23 - 7 = 16, then 16 / 2 = 8.

13. **40**

Each number is multiplied by 3 then 7 is added. 11 x 3 = 33, + 7 = 40.

14. **8**

The rule is ‘multiply by 2, then add 5’. Undo it: 21 - 5 = 16, then 16 / 2 = 8.

15. **37**

Each number is multiplied by 2 then 9 is added. 14 x 2 = 28, + 9 = 37.

16. **11**

The rule is ‘multiply by 2, then add 4’. Undo it: 26 - 4 = 22, then 22 / 2 = 11.

17. **12**

Each number is multiplied by 2 then 8 is added. 2 x 2 = 4, + 8 = 12.

18. **10**

The rule is ‘multiply by 2, then add 6’. Undo it: 26 - 6 = 20, then 20 / 2 = 10.

19. **59**

Each number is multiplied by 4 then 7 is added. 13 x 4 = 52, + 7 = 59.

20. **12**

The rule is ‘multiply by 2, then add 7’. Undo it: 31 - 7 = 24, then 24 / 2 = 12.

21. **37**

Each number is multiplied by 4 then 1 is added. 9 x 4 = 36, + 1 = 37.

22. **10**

The rule is ‘multiply by 2, then add 4’. Undo it: 24 - 4 = 20, then 20 / 2 = 10.

23. **20**

Each number is multiplied by 3 then 2 is added. 6 x 3 = 18, + 2 = 20.

24. **5**

The rule is ‘multiply by 2, then add 6’. Undo it: 16 - 6 = 10, then 10 / 2 = 5.

25. **26**

Each number is multiplied by 3 then 8 is added. 6 x 3 = 18, + 8 = 26.

26. **3**

The rule is ‘multiply by 2, then add 5’. Undo it: 11 - 5 = 6, then 6 / 2 = 3.

27. **27**

Each number is multiplied by 2 then 1 is added. 13 x 2 = 26, + 1 = 27.

28. **5**

The rule is ‘multiply by 3, then add 9’. Undo it: 24 - 9 = 15, then 15 / 3 = 5.

29. **36**

Each number is multiplied by 4 then 4 is added. 8 x 4 = 32, + 4 = 36.

30. **3**

The rule is ‘multiply by 2, then add 8’. Undo it: 14 - 8 = 6, then 6 / 2 = 3.

Counting positions



IN PLAIN WORDS

'How many are behind' is not the same as 'what position are you'. Decide whether the person counts themselves.

EXAMPLE

10 in a line, you are 4th from the front. 4 people include you, so 6 are behind you.

COMMON ERROR

Saying 'I am 4th, so 4 are in front'. Only 3 are in front - the 4th is you.

REMEMBER IT LIKE THIS

Being fifth in a line means four people are in front of you.

CHECK YOURSELF

12 in a line, you are 5th from the front. How many are behind you? (answer: 7)

1. 24 children stand in a line. Nina is 5th from the front. How many children are behind Nina? C344L7

( ) 5 ( ) 4 ( ) 20 ( ) 19

working

2. 28 children stand in a line. Owen is 22nd from the BACK. What position is Owen from the front? HNVDL5

( ) 6 ( ) 8 ( ) 7 ( ) 22

working

3. 19 children stand in a line. Sam is 12th from the front and Ella is 16th from the front. How many children stand between them? U95K3V

( ) 12 ( ) 5 ( ) 4 ( ) 3

working

4. 25 children stand in a line. Noah is 17th from the front. How many children are behind Noah? WL2WWX

( ) 17 ( ) 9 ( ) 8 ( ) 16

working

5. 22 children stand in a line. Finn is 8th from the BACK. What position is Finn from the front? WR7HX9

( ) 8 ( ) 16 ( ) 14 ( ) 15

working

6. 21 children stand in a line. Leo is 12th from the front and Jack is 16th from the front. How many children stand between them? Y22AXJ

( ) 4 ( ) 12 ( ) 5 ( ) 3

working

7. 8 children stand in a line. Grace is 2nd from the front. How many children are behind Grace? W86QBB

( ) 7 ( ) 2 ( ) 6 ( ) 1

working

8. 8 children stand in a line. Grace is 6th from the BACK. What position is Grace from the front? EKRW78

( ) 2 ( ) 3 ( ) 4 ( ) 6

working

9. 18 children stand in a line. Noah is 8th from the front and Ruby is 11th from the front. How many children stand between them? 8QCGJC

( ) 2 ( ) 3 ( ) 8 ( ) 4

working

10. 16 children stand in a line. Sam is 2nd from the front. How many children are behind Sam? AZSLSP

( ) 1 ( ) 14 ( ) 15 ( ) 2

working

11. 28 children stand in a line. Lily is 4th from the BACK. What position is Lily from the front? ZUS7DK

( ) 24 ( ) 26 ( ) 4 ( ) 25

working

12. 28 children stand in a line. Owen is 3rd from the front and Ruby is 10th from the front. How many children stand between them? CF26YR

( ) 3 ( ) 7 ( ) 8 ( ) 6

working

13. 13 children stand in a line. Mila is 8th from the front. How many children are behind Mila? TA68T5

( ) 7 ( ) 6 ( ) 5 ( ) 8

working

14. 25 children stand in a line. Nina is 11th from the BACK. What position is Nina from the front? 3E4ZPH

( ) 14 ( ) 11 ( ) 15 ( ) 16

working

15. 17 children stand in a line. Mila is 9th from the front and Lily is 16th from the front. How many children stand between them? RRE6PA

( ) 8 ( ) 9 ( ) 6 ( ) 7

working

16. 11 children stand in a line. Max is 4th from the front. How many children are behind Max? ZGXU8N

( ) 3 ( ) 7 ( ) 8 ( ) 4

working

17. 9 children stand in a line. Eli is 6th from the BACK. What position is Eli from the front? LEPKLD

( ) 4 ( ) 5 ( ) 3 ( ) 6

working

18. 12 children stand in a line. Owen is 3rd from the front and Mila is 12th from the front. How many children stand between them? 3KHQQ7

( ) 9 ( ) 3 ( ) 10 ( ) 8

working

19. 8 children stand in a line. Hugo is 3rd from the front. How many children are behind Hugo? 76Y5YJ

( ) 2 ( ) 3 ( ) 6 ( ) 5

working

20. 12 children stand in a line. Nina is 10th from the BACK. What position is Nina from the front? 8MW5U2

( ) 2 ( ) 3 ( ) 4 ( ) 10

working

21. 14 children stand in a line. Eli is 10th from the front and Nina is 13th from the front. How many children stand between them? 8VCUDF

( ) 2 ( ) 4 ( ) 3 ( ) 10

working

22. 24 children stand in a line. Max is 11th from the front. How many children are behind Max? PRC4KF

( ) 10 ( ) 14 ( ) 13 ( ) 11

working

23. 11 children stand in a line. Jack is 7th from the BACK. What position is Jack from the front? PP8CAW

( ) 6 ( ) 4 ( ) 5 ( ) 7

working

24. 24 children stand in a line. Owen is 8th from the front and Max is 12th from the front. How many children stand between them? LPZVSR

( ) 3 ( ) 4 ( ) 5 ( ) 8

working

25. 23 children stand in a line. Ruby is 17th from the front. How many children are behind Ruby? 2FJQAA

( ) 7 ( ) 6 ( ) 17 ( ) 16

working

26. 21 children stand in a line. Mia is 7th from the BACK. What position is Mia from the front? LB9T7N

( ) 15 ( ) 16 ( ) 7 ( ) 14

working

27. 16 children stand in a line. Ella is 6th from the front and Owen is 9th from the front. How many children stand between them? ZB5KH7

( ) 3 ( ) 2 ( ) 6 ( ) 4

working

28. 28 children stand in a line. Zoe is 12th from the front. How many children are behind Zoe? 2V3Y9R

( ) 17 ( ) 11 ( ) 16 ( ) 12

working

29. 26 children stand in a line. Kai is 4th from the BACK. What position is Kai from the front? DN9PY4

( ) 24 ( ) 22 ( ) 23 ( ) 4

working

30. 29 children stand in a line. Ivy is 6th from the front and Finn is 9th from the front. How many children stand between them? 8PPJTP

( ) 6 ( ) 4 ( ) 2 ( ) 3

working

Chapter 10 — Answers: Counting positions

1. **19**

Nina is in position 5, so 5 children (including Nina) are from the front up to Nina. That leaves 24 - 5 = 19 behind.

2. **7**

28 - 22 = 6 children are in front of Owen, so counting from the front Owen is number 6 + 1 = 7.

3. **3**

Ella is in position 16 and Sam is in position 12. 16 - 12 - 1 = 3 children stand between them.

4. **8**

Noah is in position 17, so 17 children (including Noah) are from the front up to Noah. That leaves 25 - 17 = 8 behind.

5. **15**

22 - 8 = 14 children are in front of Finn, so counting from the front Finn is number 14 + 1 = 15.

6. **3**

Jack is in position 16 and Leo is in position 12. 16 - 12 - 1 = 3 children stand between them.

7. **6**

Grace is in position 2, so 2 children (including Grace) are from the front up to Grace. That leaves 8 - 2 = 6 behind.

8. **3**

8 - 6 = 2 children are in front of Grace, so counting from the front Grace is number 2 + 1 = 3.

9. **2**

Ruby is in position 11 and Noah is in position 8. 11 - 8 - 1 = 2 children stand between them.

10. **14**

Sam is in position 2, so 2 children (including Sam) are from the front up to Sam. That leaves 16 - 2 = 14 behind.

11. **25**

28 - 4 = 24 children are in front of Lily, so counting from the front Lily is number 24 + 1 = 25.

12. **6**

Ruby is in position 10 and Owen is in position 3. 10 - 3 - 1 = 6 children stand between them.

13. **5**

Mila is in position 8, so 8 children (including Mila) are from the front up to Mila. That leaves 13 - 8 = 5 behind.

14. **15**

25 - 11 = 14 children are in front of Nina, so counting from the front Nina is number 14 + 1 = 15.

15. **6**

Lily is in position 16 and Mila is in position 9. 16 - 9 - 1 = 6 children stand between them.

16. **7**

Max is in position 4, so 4 children (including Max) are from the front up to Max. That leaves 11 - 4 = 7 behind.

17. **4**

9 - 6 = 3 children are in front of Eli, so counting from the front Eli is number 3 + 1 = 4.

18. **8**

Mila is in position 12 and Owen is in position 3. 12 - 3 - 1 = 8 children stand between them.

19. **5**

Hugo is in position 3, so 3 children (including Hugo) are from the front up to Hugo. That leaves 8 - 3 = 5 behind.

20. **3**

12 - 10 = 2 children are in front of Nina, so counting from the front Nina is number 2 + 1 = 3.

21. **2**

Nina is in position 13 and Eli is in position 10. 13 - 10 - 1 = 2 children stand between them.

22. **13**

Max is in position 11, so 11 children (including Max) are from the front up to Max. That leaves 24 - 11 = 13 behind.

23. **5**

11 - 7 = 4 children are in front of Jack, so counting from the front Jack is number 4 + 1 = 5.

24. **3**

Max is in position 12 and Owen is in position 8. 12 - 8 - 1 = 3 children stand between them.

25. **6**

Ruby is in position 17, so 17 children (including Ruby) are from the front up to Ruby. That leaves 23 - 17 = 6 behind.

26. **15**

21 - 7 = 14 children are in front of Mia, so counting from the front Mia is number 14 + 1 = 15.

27. **2**

Owen is in position 9 and Ella is in position 6. 9 - 6 - 1 = 2 children stand between them.

28. **16**

Zoe is in position 12, so 12 children (including Zoe) are from the front up to Zoe. That leaves 28 - 12 = 16 behind.

29. **23**

26 - 4 = 22 children are in front of Kai, so counting from the front Kai is number 22 + 1 = 23.

30. **2**

Finn is in position 9 and Ivy is in position 6. 9 - 6 - 1 = 2 children stand between them.