



Practise this type in the Karotto app, with questions read aloud and hints when stuck. Scan the code or visit playkarotto.com

Logic

Standing in line

- 1 There are 9 friends in a line. The fox is number 8 from the front. Counting from the back, what number is the fox?



Answer: _____

Who is the tallest

- 2 We know that the piglet is taller than the chick, the piglet is shorter than the fox. Who is the shortest?

(A) chick (B) piglet (C) fox

Answer: _____

How many in the family

- 3 In a family, the frog is a boy and has 3 younger sisters and 2 younger brothers. How many children do his parents have?



Answer: _____

Balance scales

- 4 1 egg weighs the same as 2 fish, 1 fish weighs the same as 3 corn cobs. 1 egg weighs the same as how many corn cobs?



Answer: _____

Adding or taking the same each time

- 5 Find the pattern, then fill in the next number in the empty box.

51 48 45 42 ?

Answer: _____

Which picture comes next

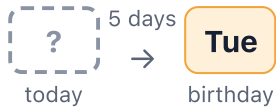
- 6 The pictures follow a repeating pattern. Which picture goes in the empty box?



Answer: _____

Yesterday, today, tomorrow

- 7 The puppy's birthday is on a Tuesday, and it is 5 days away. What day is today?



- (A) Monday (B) Thursday (C) Friday (D) Sunday

Answer: _____

Letter patterns

- 8 These letters follow a pattern. Which letter goes in the empty box?



Answer: _____

Mystery number table

- 9 In each row, the third number is made from the first two in the same way. Find the number for the question mark.

7 4 12

4 2 7

3 8

Answer: _____

Arithmetic

Quick calculating

- 10 Work it out quickly, then fill in the answer in the empty box.

$$1 + 2 + 3 + \dots + 6 = \boxed{}$$

Answer: _____

What number goes in the box

- 11 What number goes in the empty box?

$$70 + \boxed{} = 87$$

Answer: _____

Pictures for numbers

- 12 Each kind of picture stands for a number. What number is the fish?

$$\text{corn} + \text{corn} = 6$$

$$\text{corn} + \text{fish} = 9$$

$$\text{fish} = \boxed{}$$

Answer: _____

Sharing to make it equal

- 13 At first, the puppy has 19 apples and the frog has 1 apple. How many apples must the puppy give the frog so they both have the same number of apples?



Answer: _____

Age puzzles

- 14 This year, Mom is 20 years older than the puppy. In 4 years, how many years older than the puppy will Mom be?



Answer: _____

Counting animal legs

- 15 In the yard there are 5 hens and 4 dogs. How many legs are there in all?



Answer: _____

Planting trees and sawing logs

- 16 A pot can cook 3 bowls of noodles at once, and each cooking takes 7 minutes. What is the shortest time to cook 7 bowls?



Answer: _____

Fill in plus and minus

- 17 Put a plus or a minus sign in each empty box to make the sum correct. Choose the right signs.

$$1 \boxed{} 2 \boxed{} 3 \boxed{} 4 = 4$$

(A) + - + (B) + - - (C) + + + (D) - - +

Answer: _____

Letter sums

- 18 Each letter stands for a number. The same letters are the same number. Fill in the empty box.

$$14 - A = A$$

$$A = \boxed{}$$

Answer: _____

Sharing so no one gets the same

- 19 Share all 13 strawberries among 3 children. Everyone gets some, and no two children get the same number. At most how many can the child with the most get?



Answer: _____

Number Theory

Counting numbers

- 20 How many numbers are bigger than 60 and smaller than 68?

Answer: _____

Even or odd

- 21 Is the answer to this sum even or odd?

$$7 + 15 + 17 + 17$$

(A) Even (B) Odd

Answer: _____

Tens and ones

- 22 How many two-digit numbers have 9 as the tens digit?

Answer: _____

Which term of the sequence

- 23** The numbers go 22, 32, 42, 52, ... Which number is in position 8?

22 32 42 52 ... ?

Answer: _____

Counting digits

- 24** If you write all the numbers from 1 to 21 in a row, how many digits do you write in all?

Answer: _____

Making numbers from digits

- 25** Use the digits 8, 5, 6, each one at most once. What is the biggest number with 2 digits you can make?

8 5 6

Answer: _____

Adding up the digits

- 26** Find the biggest number with 2 digits whose digits add up to 6.

Answer: _____

Two numbers from four digits

- 27** Use all four digits 1, 2, 4, 5, each one once, to write two 2-digit numbers. What is the smallest possible sum of the two numbers?

1 2 4 5

Answer: _____

Geometry

Counting squares

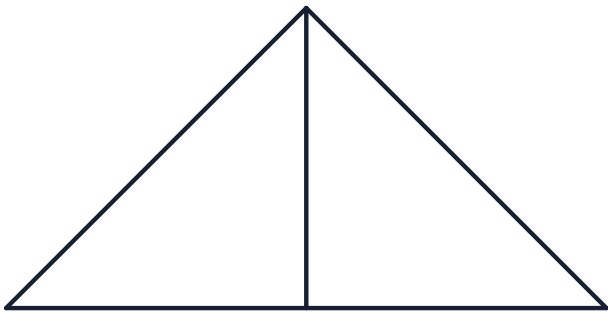
- 28** How many squares are there in the picture in all?



Answer: _____

Counting triangles

29 How many triangles are there in the picture in all?



Answer: _____

Counting line segments

30 The picture has 5 points on one straight line. How many line segments are there in all?



Answer: _____

Counting rectangles

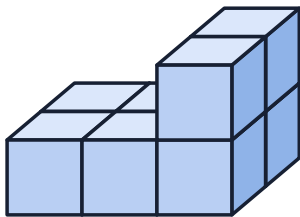
31 How many rectangles are there in the picture in all? Squares count as rectangles too.



Answer: _____

Counting cubes

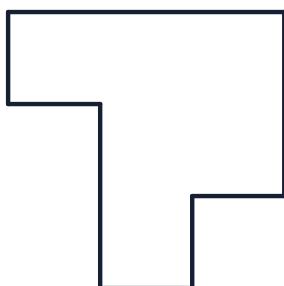
32 How many cubes are in the picture? A cube on top always has a cube under it.



Answer: _____

How many sides and corners

- 33 How many corners does the shape have?



Answer: _____

Matchstick shapes

- 34 Making 2 squares in a row like in the picture takes 7 matchsticks. How many matchsticks do you need for 6 squares in a row like this?



Answer: _____

Cutting cakes, drawing lines

- 35 You cut a round cake with 4 straight cuts, and every cut goes through the middle. How many pieces do you get?



Answer: _____

Combinatorics

How many ways to choose

- 36 Bunny has 2 shirts and 3 pairs of pants. How many ways can Bunny pick 1 shirt and 1 pair of pants to wear?



Answer: _____

How many numbers can you make

- 37 Using the digits 8, 4, 7, how many numbers with 2 different digits can you make?

8 4 7

Answer: _____

Which number is the k-th largest

38 Put the numbers 28, 74, 51, 82 in order from biggest to smallest. Which number is in place 2?

28

74

51

82

Answer: _____

Ways to share sweets

39 Share 8 candies between the fox and the frog. One of them may get none. How many ways are there?



Answer: _____

Ways to line up

40 There are three friends: fox, bear cub, piglet. They stand in a line. How many different ways can they line up?



Answer: _____

Handshakes

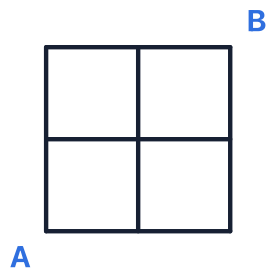
41 5 teams play, and every two teams play each other exactly once. How many games are there in all?



Answer: _____

Counting paths

42 Follow the lines. Each step can only go right or up. How many ways are there to go from A to B?



Answer: _____

Coin combinations

43 How many ways can you make 7 coins using coins worth 1, 2? You can take any number of each kind, and the order doesn't matter.



Answer: _____

Picking marbles to be sure

- 44** A box has 3 red marbles and 4 blue marbles. Without looking, what is the smallest number of marbles you must take out to be sure to get 1 red marble?



Answer: _____

Making even and odd numbers

- 45** Using the digits 5, 6, 2, how many odd numbers with 2 different digits can you make?

5 6 2

Answer: _____

Choosing and giving prizes

- 46** There are 4 different things in the picture. You choose 2 of them. How many ways can you choose?



Answer: _____

Paying with coins

- 47** You have coins marked 1, 2, 10. Without getting change, how many different amounts can you pay exactly?



1 2 10

Answer: _____

Answers and solutions

1. Answer: 2 · Standing in line

How to think: Count how many friends are behind the fox.

Solution: Behind the fox, there are 9 minus 8 equals 1 friend. So counting from the back, the fox is number 1 plus 1 equals 2.

2. Answer: chick · Who is the tallest

How to think: Line the friends up from tallest to shortest.

Solution: From tallest to shortest: fox, piglet, chick. So it's the chick.

3. Answer: 6 · How many in the family

How to think: Draw all the children in the family, and remember to draw the frog too.

Solution: 3 plus 2 plus 1 equals 6, because we count the frog too.

4. Answer: 6 · Balance scales

How to think: Swap each thing for the lighter one, one step at a time.

Solution: 1 egg weighs the same as 2 fish. Each fish weighs the same as 3 corn cobs. Swap them all: 3 plus 3 equals 6 corn cobs.

5. Answer: 39 · Adding or taking the same each time

How to think: Look at each pair of numbers side by side. How much bigger or smaller is the next number?

Solution: The next step takes away 3: 42 minus 3 equals 39.

6. Answer: · Which picture comes next

How to think: Find how many pictures it takes to start over. Circle one group.

Solution: The empty box is picture number 3 of its group, the same as picture number 3 of the first group.

7. Answer: Thursday · Yesterday, today, tomorrow

How to think: The birthday is still ahead, so count back from Tuesday to today.

Solution: Go back 5 days from Tuesday: Monday, Sunday, Saturday, Friday, Thursday. So today is Thursday.

8. Answer: J · Letter patterns

How to think: Say the alphabet A, B, C, D, E... and count how many steps apart the letters are.

Solution: Each time we go forward 2 steps in the alphabet. 2 steps after H is J.

9. Answer: 12 · Mystery number table

How to think: Look at the first row: how do the first two numbers make the third? Try adding, taking away, multiplying.

Solution: Row one: 7 plus 4 plus 1 equals 12. Row two: 4 plus 2 plus 1 equals 7. So row three: 3 plus 8 plus 1 equals 12.

10. Answer: 21 · Quick calculating

How to think: Pair the first number with the last, the second with the second to last... All the pairs are equal.

Solution: There are 3 pairs, each equal to 7: 3 times 7 equals 21.

11. Answer: 17 · What number goes in the box

How to think: Is the empty box a part, or the whole?

Solution: 87 minus 70 equals 17. Check: 70 plus 17 equals 87.

12. Answer: 6 · Pictures for numbers

How to think: Start with the line that has only one kind of picture.

Solution: We see that the corn cob is 3, so the fish is 9 minus 3 equals 6.

13. Answer: 9 · Sharing to make it equal

How to think: First: how many more apples does the puppy have than the frog?

Solution: The extra is 18 apples. Give your friend half: half of 18 is 9. Then each friend has 10 apples.

14. Answer: 20 · Age puzzles

How to think: Each year, how many years older do Mom and the puppy each get?

Solution: Each year, both get 1 year older, so Mom is still 20 years older than the puppy.

15. Answer: 26 · Counting animal legs

How to think: Each hen has 2 legs, and each dog has 4 legs.

Solution: 5 hens have 10 legs, 4 dogs have 16 legs. In all: 10 plus 16 equals 26 legs.

16. Answer: 21 · Planting trees and sawing logs

How to think: Each time, 3 bowls cook together.

Solution: We need to cook 3 times, 7 minutes each time: 7 plus 7 plus 7 equals 21 minutes.

17. Answer: + - + · Fill in plus and minus

How to think: Try each set of signs and work from left to right to see if you get the answer.

Solution: We fill in: 1 plus 2 minus 3 plus 4 equals 4. Work from left to right: 1, 3, 0, 4.

18. Answer: 7 · Letter sums

How to think: Take A away from 14 and you get A again. So what is A plus A?

Solution: 14 minus A equals A, so A plus A equals 14. Two equal numbers that add up to 14 are 7 each. So A is 7.

19. Answer: 10 · Sharing so no one gets the same

How to think: The children must get different numbers. Try lining them up from fewest to most.

Solution: The other 2 get as few as possible: 1, 2, that is 3 in all. The last child gets 13 minus 3, which is 10.

20. Answer: 7 · Counting numbers

How to think: Don't count 60 or 68.

Solution: 68 minus 60 equals 8. We don't count 68, so 8 minus 1 equals 7 numbers.

21. Answer: Even · Even or odd

How to think: You don't need to work out the whole sum. Just count how many odd numbers there are.

Solution: There are 4 odd numbers. They pair up with none left over, so the answer is even.

22. Answer: 10 · Tens and ones

How to think: Which digit is fixed? Which digit can you choose freely?

Solution: The ones digit has 10 choices, from 0 to 9. The numbers are 90, 91, ... up to 99: 10 numbers.

23. Answer: 92 · Which term of the sequence

How to think: How many steps is it from the first number to position 8?

Solution: Keep going step by step: 22, 32, 42, 52, 62, 72, 82, 92. The number in position 8 is 92.

24. Answer: 33 · Counting digits

How to think: A one-digit number takes 1 digit, and a two-digit number takes 2 digits.

Solution: From 1 to 9 you write 9 digits. From 10 to 21 there are 12 numbers, so you write 24 digits. In all: 9 plus 24 equals 33.

25. Answer: 86 · Making numbers from digits

How to think: Put the biggest digit first.

Solution: Pick the biggest digits and put them from biggest to smallest: you get 86.

26. Answer: 60 · Adding up the digits

How to think: For the biggest number, the first digit must be as big as possible.

Solution: The biggest first digit possible is 6, so the number is 60.

27. Answer: 39 · Two numbers from four digits

How to think: A digit in the tens place is worth 10 times as much as in the ones place. Which digits go in the tens place?

Solution: The two smallest digits 1, 2 go in the tens place, and 4, 5 go in the ones place: 14 plus 25 equals 39.

28. Answer: 11 · Counting squares

How to think: Count the small 1-box squares first, then the 4-box squares, the 9-box squares...

Solution: Count from small to big: 8 plus 3 equals 11 squares.

29. Answer: 3 · Counting triangles

How to think: Count the 1-part triangles first, then the triangles made of 2 parts, 3 parts...

Solution: Count the triangles of 1 part, 2 parts, 3 parts...: 2 plus 1 equals 3 triangles.

30. Answer: 10 · Counting line segments

How to think: Count in order: the segments starting at the first point, then the ones starting at the second point, and so on.

Solution: Count the segments starting at each point: 4 plus 3 plus 2 plus 1 equals 10 segments.

31. Answer: 6 · Counting rectangles

How to think: Count the 1-box shapes, then the shapes made of 2 boxes, 3 boxes...

Solution: Count the shapes of 1 box, 2 boxes, 3 boxes...: 3 plus 2 plus 1 equals 6 shapes.

32. Answer: 8 · Counting cubes

How to think: Count column by column, and remember the hidden cubes underneath.

Solution: Add up the cubes in each column: 1 plus 1 plus 2 plus 1 plus 1 plus 2 equals 8 cubes.

33. Answer: 8 · How many sides and corners

How to think: Go around the shape and count every place where the edge turns, including the corners that point inward.

Solution: 6 corners pointing out plus 2 corners pointing in equals 8 corners.

34. Answer: 19 · Matchstick shapes

How to think: The first square needs 4 sticks. Each next square shares 1 stick with the one before it.

Solution: The first square needs 4 sticks, and the 5 squares after it need 3 more each: 4 plus 5 times 3 equals 19 sticks.

35. Answer: 8 · Cutting cakes, drawing lines

How to think: The first cut makes 2 pieces. How many more does each new cut add?

Solution: Each cut through the middle gives 2 pieces. 4 cuts give 2 plus 2 plus 2 plus 2, which is 8 pieces.

36. Answer: 6 · How many ways to choose

How to think: Try matching each shirt with every pair of pants.

Solution: Each shirt goes with 3 pairs of pants, and there are 2 shirts: 3 plus 3 equals 6 ways.

37. Answer: 6 · How many numbers can you make

How to think: Choose the first digit first, then the next digits.

Solution: The first place has 3 choices, and for each one the next place has 2 choices: 2 plus 2 plus 2 equals 6 numbers.

38. Answer: 74 · Which number is the k-th largest

How to think: Compare the first digits first. If the first digits are the same, compare the next digits.

Solution: From biggest to smallest: 82, 74, 51, 28. The number in place 2 is 74.

39. Answer: 9 · Ways to share sweets

How to think: Count by how many candies the fox gets: 0, 1, 2, and so on.

Solution: The fox can get from 0 to 8 candies, and each number is one way: 9 ways.

40. Answer: 6 · Ways to line up

How to think: Choose who stands first, then who stands second, and so on to the last one.

Solution: For each friend at the front, the other two can stand 2 ways. 3 friends can be at the front: 2 plus 2 plus 2 equals 6 ways.

41. Answer: 10 · Handshakes

How to think: The first team plays the 4 other teams.

Solution: Add up each team's new games: 4 plus 3 plus 2 plus 1 equals 10 games.

42. Answer: 6 · Counting paths

How to think: Points on the bottom edge and on the left edge have only 1 way to get there.

Solution: Write the number of ways at each point: each point is the point on its left plus the point below. There are 6 ways to reach B.

43. Answer: 4 · Coin combinations

How to think: Start by using as many coins worth 2 as you can.

Solution: List them one by one, starting with the most coins worth 2, without missing any: there are 4 ways.

44. Answer: 5 · Picking marbles to be sure

How to think: Think of the unluckiest case: the marbles you take out are never the ones you want.

Solution: The unluckiest case: you take out all 4 blue marbles first, then the next one is sure to be red: 4 plus 1 equals 5 marbles.

45. Answer: 2 · Making even and odd numbers

How to think: An odd number ends in 1, 3, 5, 7 or 9. Choose the ones digit first.

Solution: An odd number ends in 1, 3, 5, 7 or 9. The numbers are: 25, 65. That makes 2 numbers.

46. Answer: 6 · Choosing and giving prizes

How to think: Pair the first thing with each other thing, then the second thing with the ones not paired yet.

Solution: The first thing pairs with 3 things. Each next one makes one fewer new pair: 3 plus 2 plus 1 equals 6 ways.

47. Answer: 7 · Paying with coins

How to think: Try paying with one coin, then two coins, then three. Write down each amount.

Solution: The amounts you can pay are 1, 2, 3, 10, 11, 12, 13. That makes 7 amounts.
