Puzzles and problems for Years 1 and 2
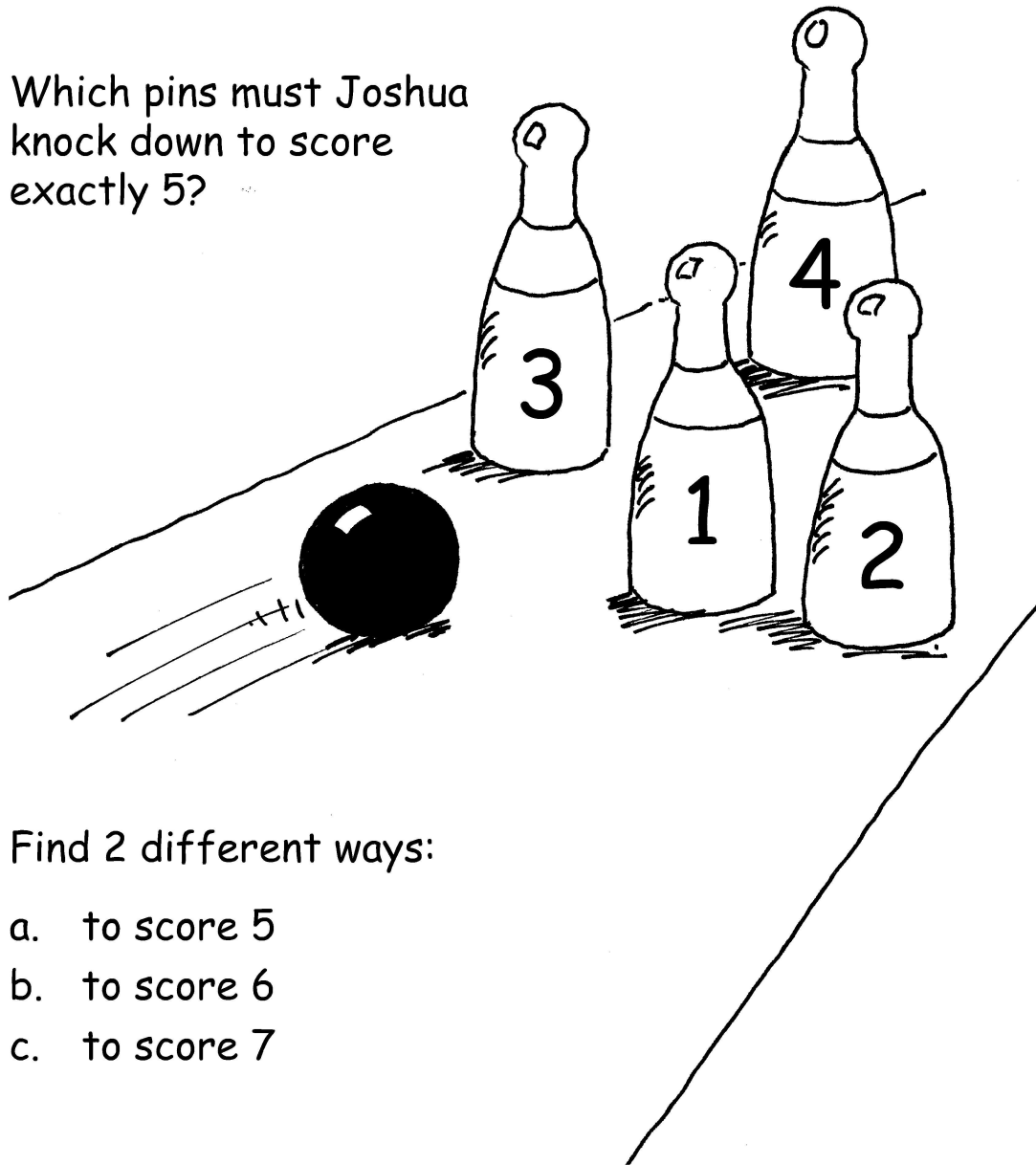
Four-pin bowling

Which pins must Joshua
knock down to score
exactly 5?

Find 2 different ways:

a.   to score 5
b.   to score 6
c.   to score 7
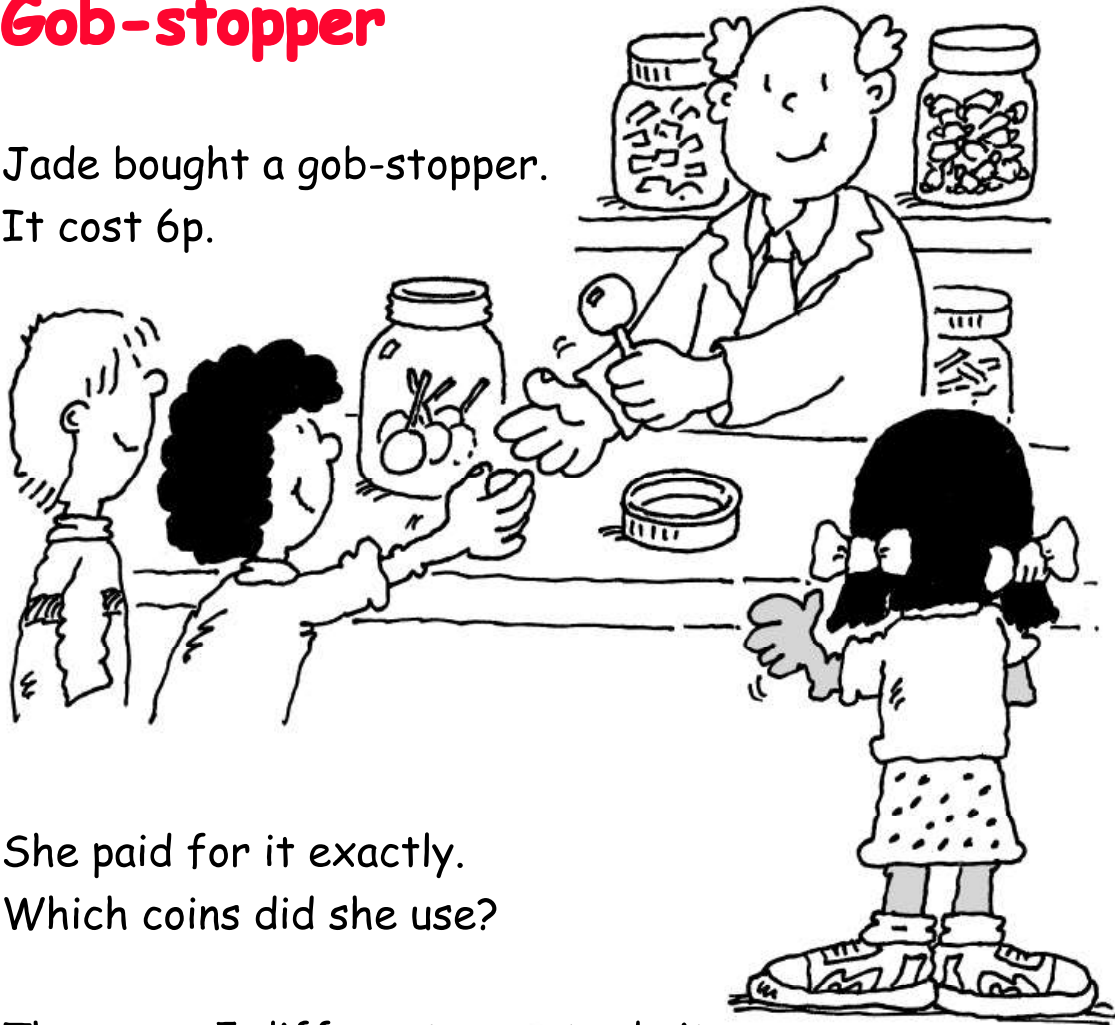
Gob-stopper

Jade bought a gob-stopper.
It cost 6p.

She paid for it exactly.
Which coins did she use?

There are 5 different ways to do it.
Find as many as you can.

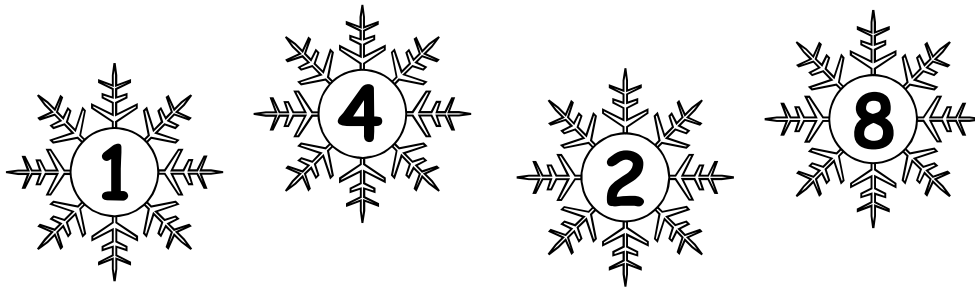What if the gob-stopper cost 7p?

2

Pick a pair

Choose from these numbers.

1. Pick a pair of numbers.
   Add them together.
   Write the numbers and the answer.

   Pick a different pair of numbers.
   Write the numbers and the answer.

   Keep doing it.
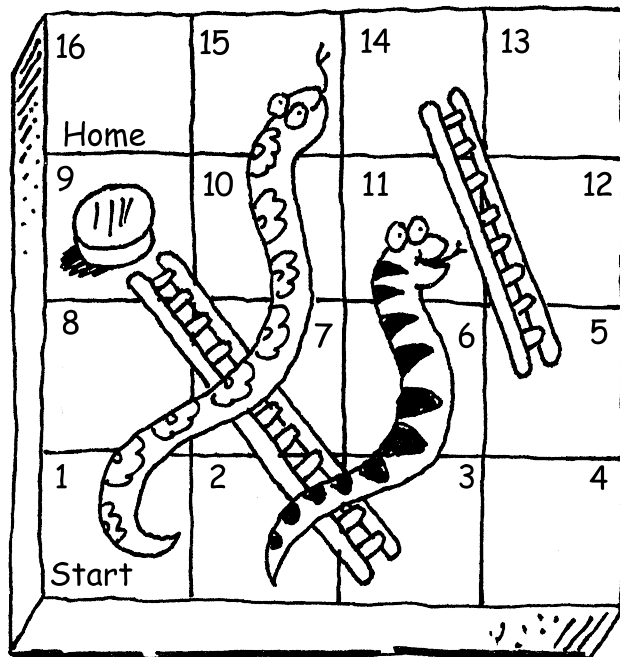   How many different answers can you get?

2. Now take one number from the other.
   How many different answers can you get now?

Snakes and ladders

Your counter is on 9.

You roll a 1 to 6 dice.
After two moves you land on 16.

Find all the different ways you can do it.

Now think of other questions you could ask.
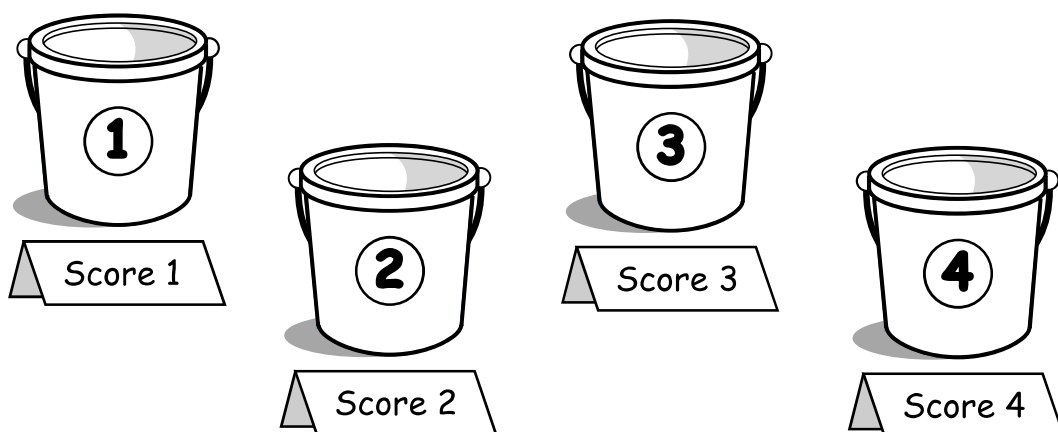
4

Bean-bag buckets

Dan threw 3 bean-bags.
Each bag went in a bucket.
More than one bag can go in a bucket.

Score 1

Score 2

Score 3

Score 4

1. What is the highest score Dan can get?

2. Find three ways to score 6.

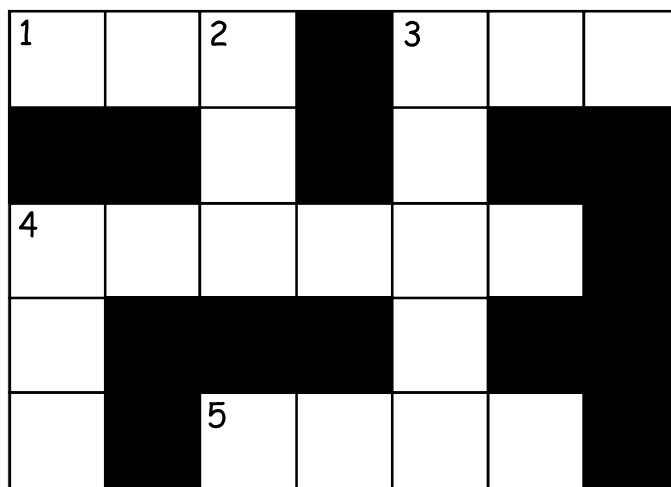3. Find three ways to score 9.

4. What other scores can Dan get?

5

Crossword

Write the answers to this puzzle in words:
ONE, TWO, THREE, ...

Across

1. 7 – 5

3. 2 + 5 – 1

4. 4 + 4 + 4

5. 13 – 4

Down

2. 3 + 4 – 6

3. 9 – 2

4. 11 – 4 + 3

6

Gold bars

Pete is a pirate.

His gold bars are in piles.

He can move one or more bars at a time.
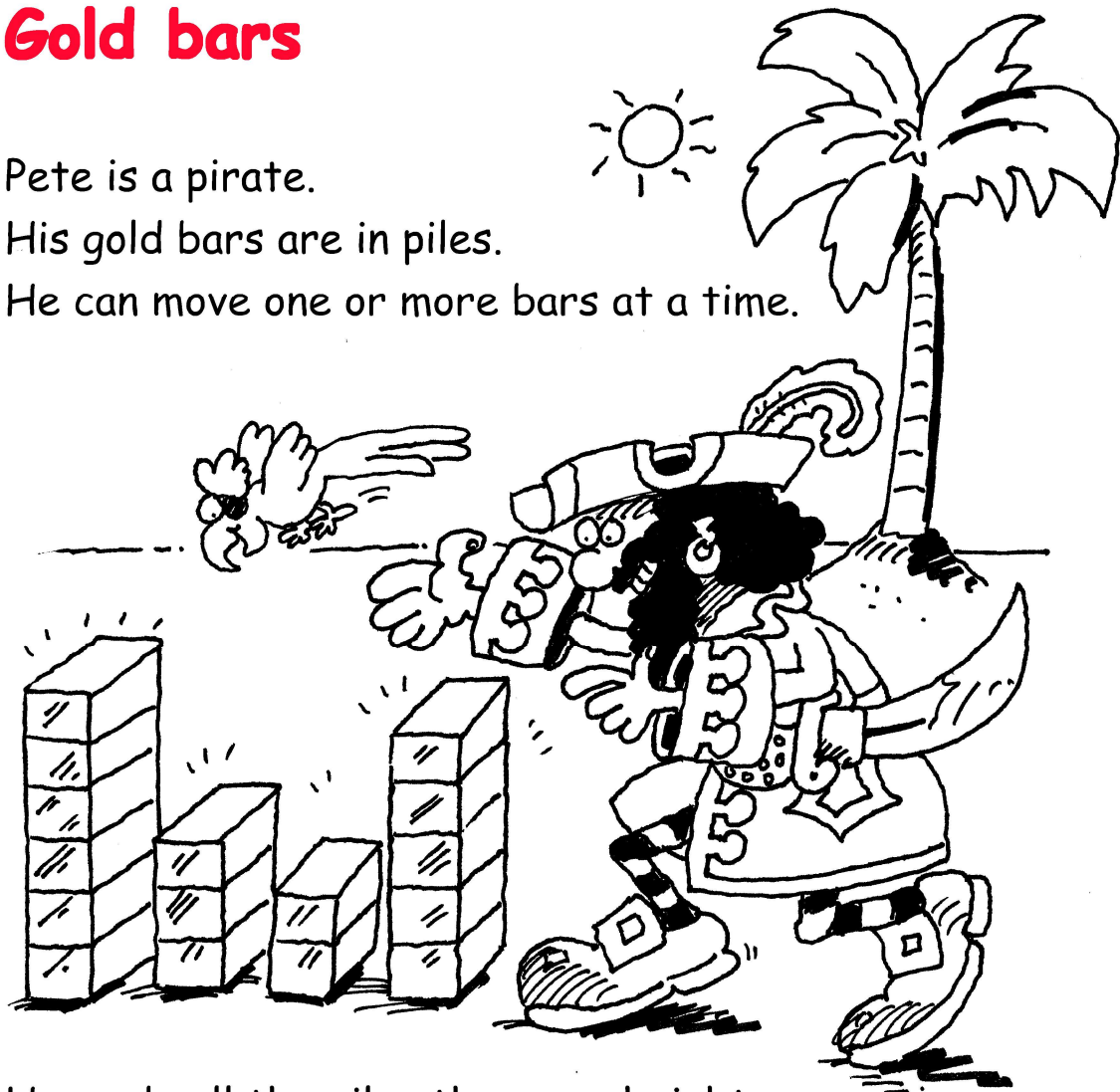
He made all the piles the same height.

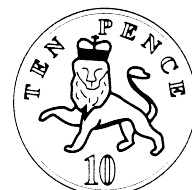He made just two moves.
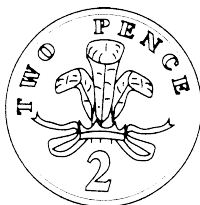
How did he do it?

Ride at the fair

Lucy had a ride at the fair.
Her Mum asked Lucy to pay less than 20p towards it.

Lucy paid exactly three coins towards the ride.
How much did Lucy pay her Mum?
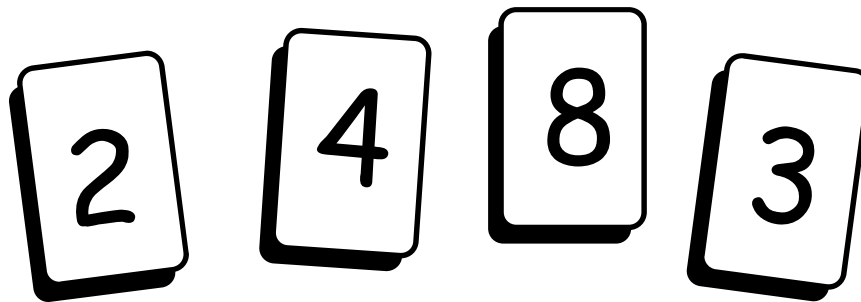
Find different ways to do it.

8

Sum up

Choose from these four cards.

2 4 8 3

Make these totals:

  9
 10
 11
 12
 13
 14
 15

What other totals can you make from the cards?
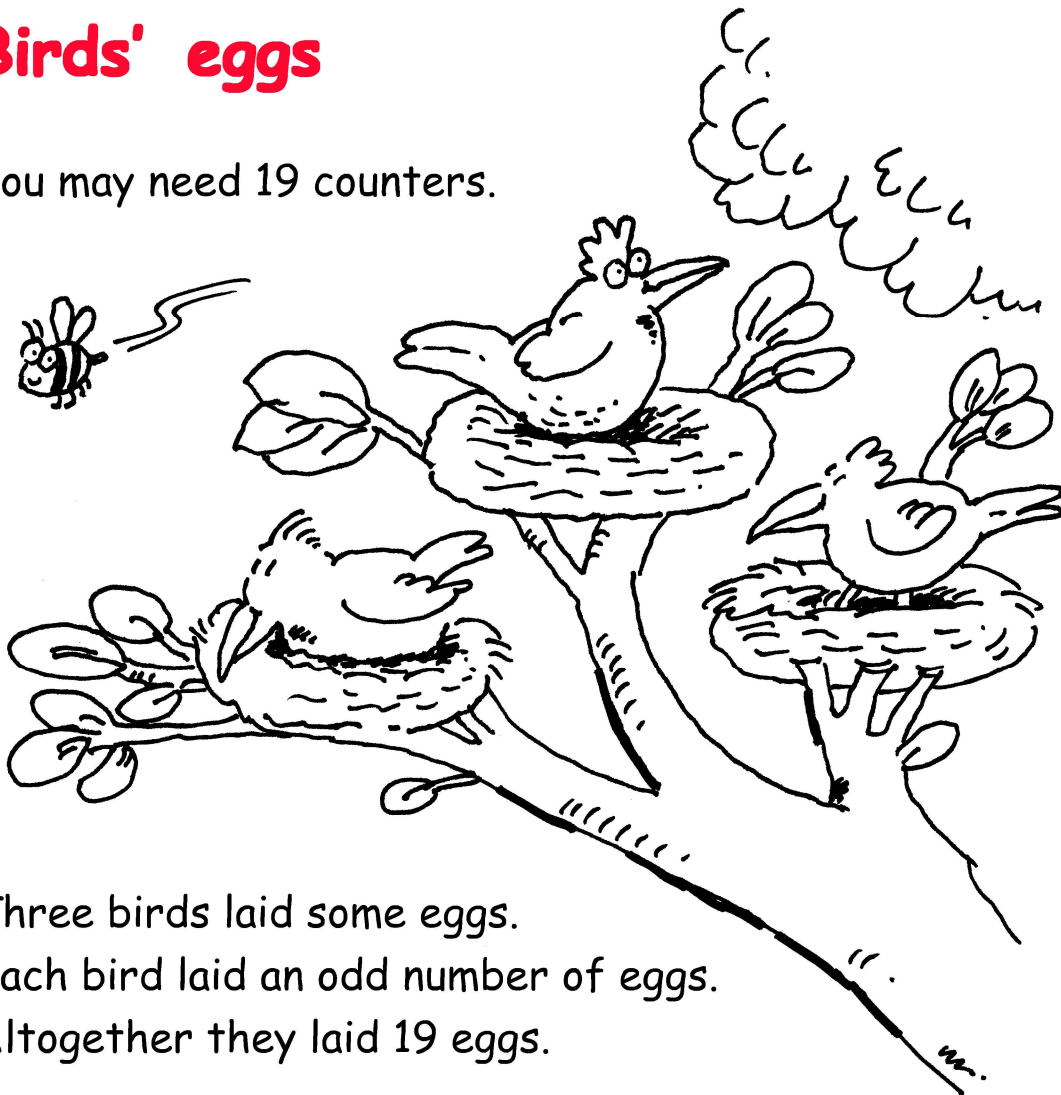
Birds' eggs

You may need 19 counters.

Three birds laid some eggs.
Each bird laid an odd number of eggs.
Altogether they laid 19 eggs.

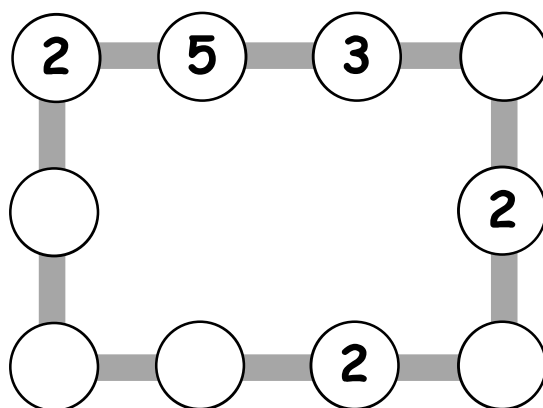How many eggs did each bird lay?
Find different ways to do it.

10

Number lines

1. Make each line add up to 16.

```
( 2 )---( 5 )---( 3 )---(   )
  |                       |
(   )                   ( 2 )
  |                       |
(   )---(   )---( 2 )---(   )
```

2. Make each line add up to 20.
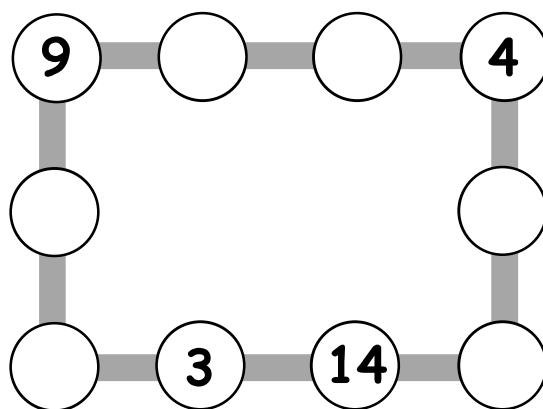
```
( 9 )---(   )---(   )---( 4 )
  |                       |
(   )                   (   )
  |                       |
(   )---( 3 )---( 14 )--(   )
```

3. Make up your own puzzle like this.
   Ask a friend to do it.

Odd one out

1. Here is a grid of 16 squares.
    One square is different from all the others.
    Mark it on the grid.
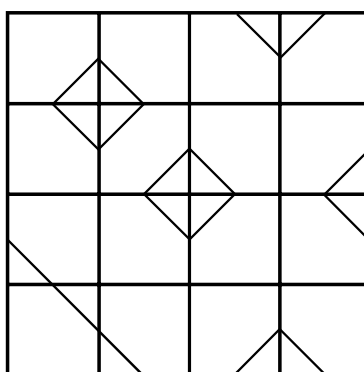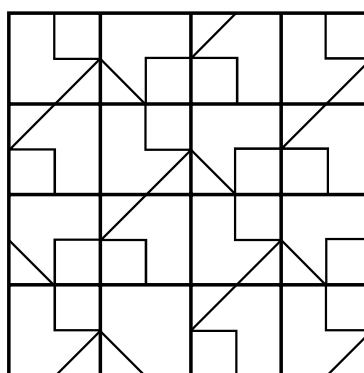
2. Now do this one.

12

Line of symmetry

You need:

some squared paper,

a red pen, a green pen and a blue pen.

Gopal had six squares: two red, two green, two blue.

He put them in a line.

The squares made a symmetrical pattern.

red	blue	green	green	blue	red

Arrange six squares in a line.

Make two squares red, two green and two blue.

Make the line of squares symmetrical.
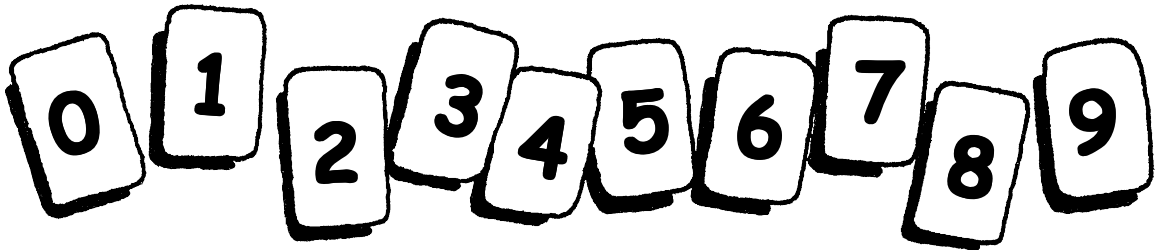
How many different lines can you make like this?

13

Card sharp

Take ten cards numbered 0 to 9.

1. Pick three cards with a total of 12.
    You can do it in 10 different ways.
    See if you can record them all.

2. Now pick four cards with a total of 12.
    How many different ways can you do it?
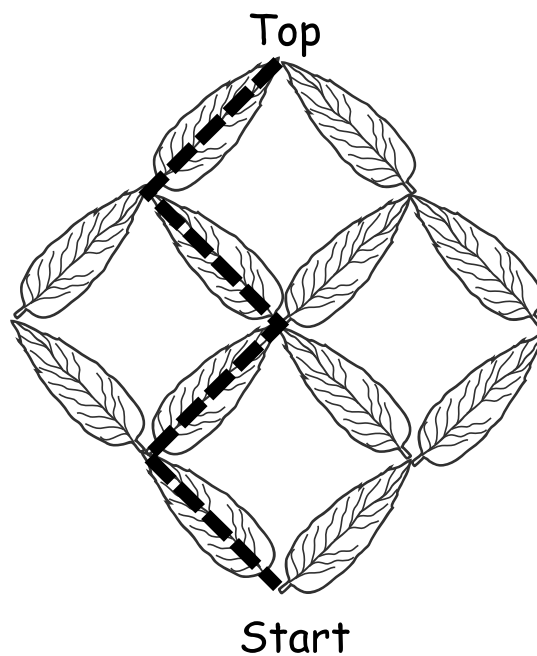
3. Can you pick five cards with a total of 12?

14

Jack and the beanstalk

Jack climbed the beanstalk.
He always went upwards.

Top

Start

He first did it like this: left, right, left, right.

Find five other ways that Jack can climb the beanstalk.

Monster

Alesha bought a monster using only silver coins.
It cost her 45p.

There are nine different ways to pay 45p exactly using only silver coins.
Find as many as you can.

What if the monster cost 50p?
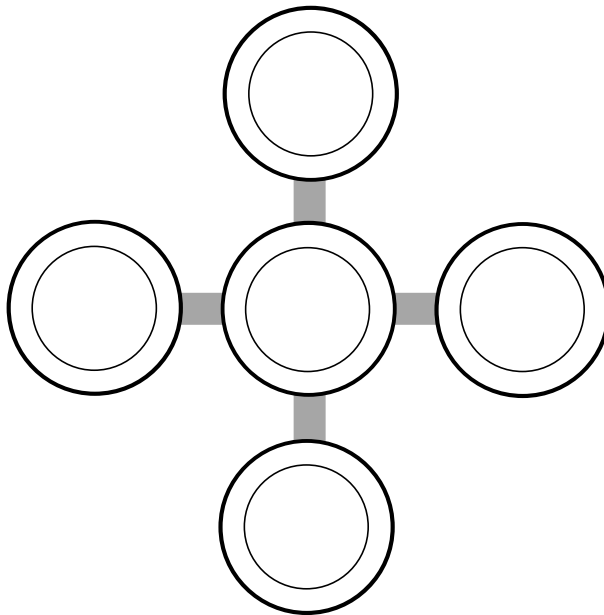How many different ways are there to pay now?

16

Cross-road

You need 5 paper plates and 15 counters.
Put the plates in a cross.

Use all 15 counters.

Put a different number on each plate.

Make each line add up to 10.

Do it again.

This time make each line add up to 8.

Fireworks

Emma had some fireworks.
Some made 3 stars.
Some made 4 stars.

Altogether Emma's fireworks made 19 stars.
How many of them made 3 stars?
Find two different answers.

What if Emma's fireworks made 25 stars?
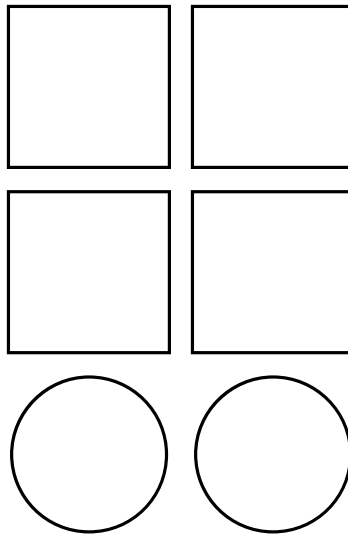Find two different answers.

18

Coloured shapes

What colour is each shape?
Write it on the shape.

Clues

- ◆ Red is not next to grey.
- ◆ Blue is between white and grey.
- ◆ Green is not a square.
- ◆ Blue is on the right of pink.

Ones and twos

Holly has six numbers, three 1s and three 2s.
She also has lots of + signs, x signs and = signs.

$$1 \quad 2 \quad 1 \quad 2 \quad 1 \quad 2$$

She is trying to make the biggest number possible.
Here are some she tried.

First try

$1 \times 2 = 2$
$1 \times 2 = 2$
$1 \times 2 = 2$
$2 + 2 + 2 = 6$

Second try

$1 + 2 + 1 + 2 + 1 + 2 = 9$

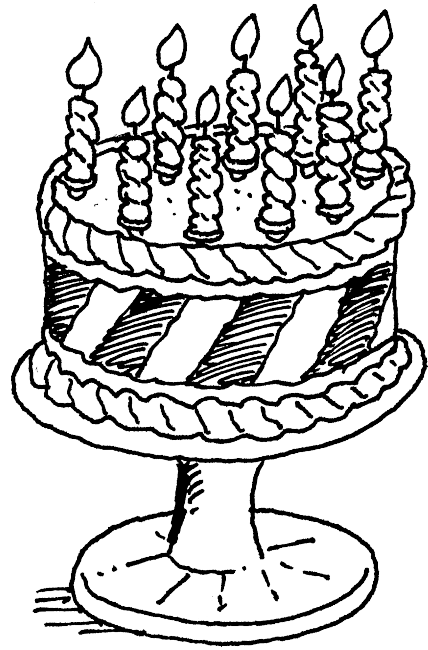Can you beat Holly's score?

What if Holly had three 2s and three 3s?

20

Birthdays

Mum and Paul are talking about birthdays.

They take Paul's age and double it.
Then they add 5.
The answer is 35.
Mum says this is her age.
How old is Paul?

Make up more problems like this.
Try to use some of these words:

double   halve   add   subtract

Christmas tree

Rudolph put four stars on a tree.
He coloured each star either red or yellow.

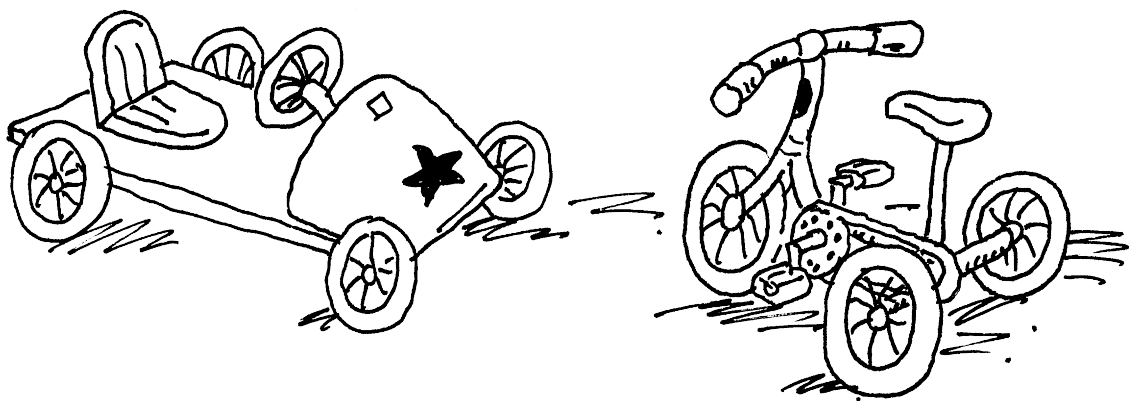In how many different ways can Rudolph colour
the four stars?

At the toy shop

The toy shop stocks tricycles and go-carts.
The tricycles have 3 wheels.
The go-carts have 5 wheels.

Suna counted the wheels.
He counted 37 altogether.

How many tricycles are there?
How many go-carts?

Find two ways to do it.

Ben's numbers

Ben has written a list of different whole numbers.
The digits of each number add up to 5.
None of the digits is zero.

Here is one of Ben's numbers.

23

Ben has written all the numbers he can think of.
How many different numbers are there in his list?
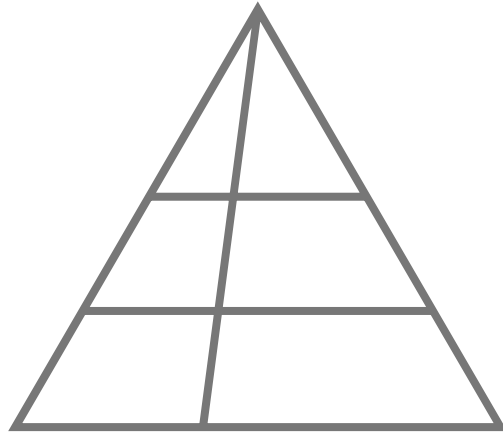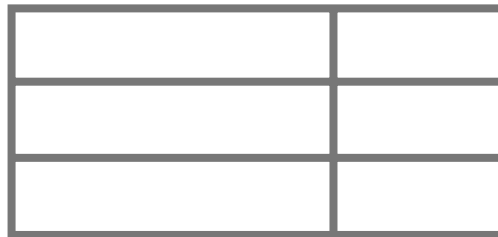
Write all the numbers in order.

24

Spot the shapes 1

1. How many triangles
    can you count?

2. How many rectangles
    can you count?

3. Draw your own diagram to count triangles.
    How many can a friend find?
    Can you find more?

Puzzles and problems for Years 3 and 4

Rows of coins

1. Take five coins: 1p, 2p, 5p, 10p, 20p.

   Put them in a row using these clues.

   The total of the first three coins is 27p.

   The total of the last three coins is 31p.

   The last coin is double the value of the first coin.

2. Take six coins: two 1p, two 2p and two 5p.

   Put them in a row using these clues.

   Between the two 1p coins there is one coin.

   Between the two 2p coins there are two coins.

   Between the two 5p coins there are three coins.

   What if you take two 10p coins as well, and
   between them are four coins?

Roly poly

The dots on opposite faces of a dice add up to 7.
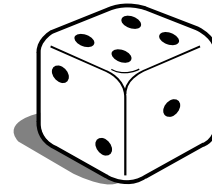
1. Imagine rolling one dice.
    The score is the total number
    of dots you can see.
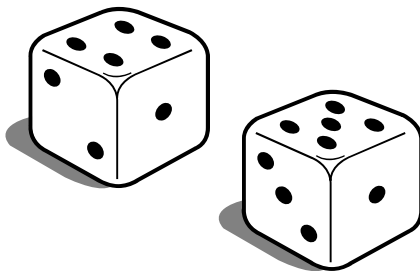   You score 17.
    Which number is face down?
    How did you work out your answer?

2. Imagine rolling two dice.
    The dice do not touch each other.

    The score is the total number of dots you can see.
    Which numbers are face down to score 30?

27

Dan the detective

1. Dan the detective looked for a number.
   He found a two-digit number less than 50.
   The sum of its digits was 12.
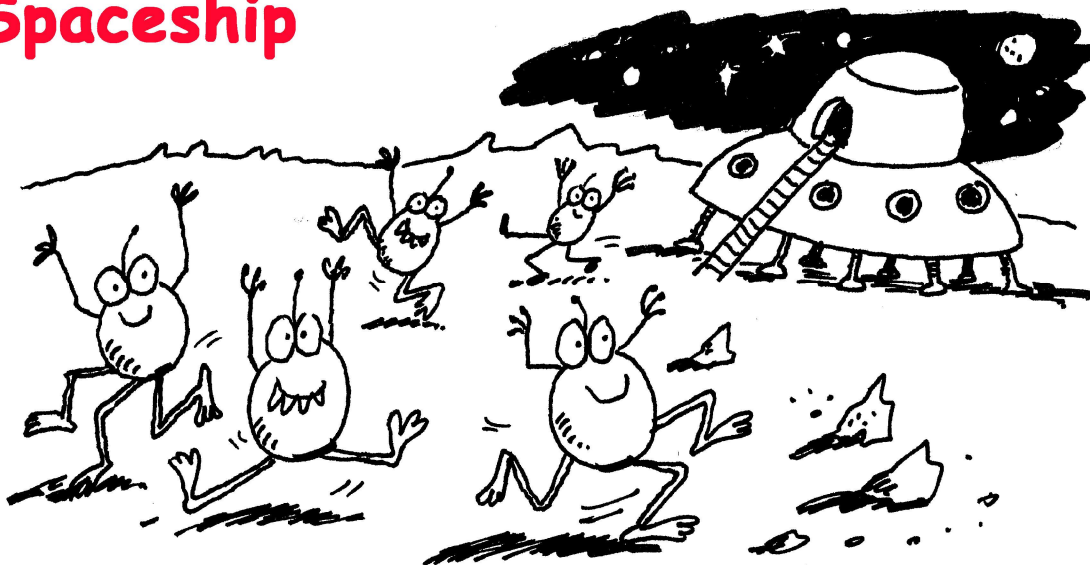   Their difference was 4.

   What number did Dan find?

2. Dan found a two-digit odd number.
   One of its digits was half the other.
   The number was greater than 50.

   What number did Dan find?

Spaceship

Some Tripods and Bipods flew from planet Zeno.
There were at least two of each of them.

Tripods have 3 legs.
Bipods have 2 legs.
There were 23 legs altogether.

How many Tripods were there?
How many Bipods?

Find two different answers.

29

Susie the snake

Susie the snake has up to 20 eggs.
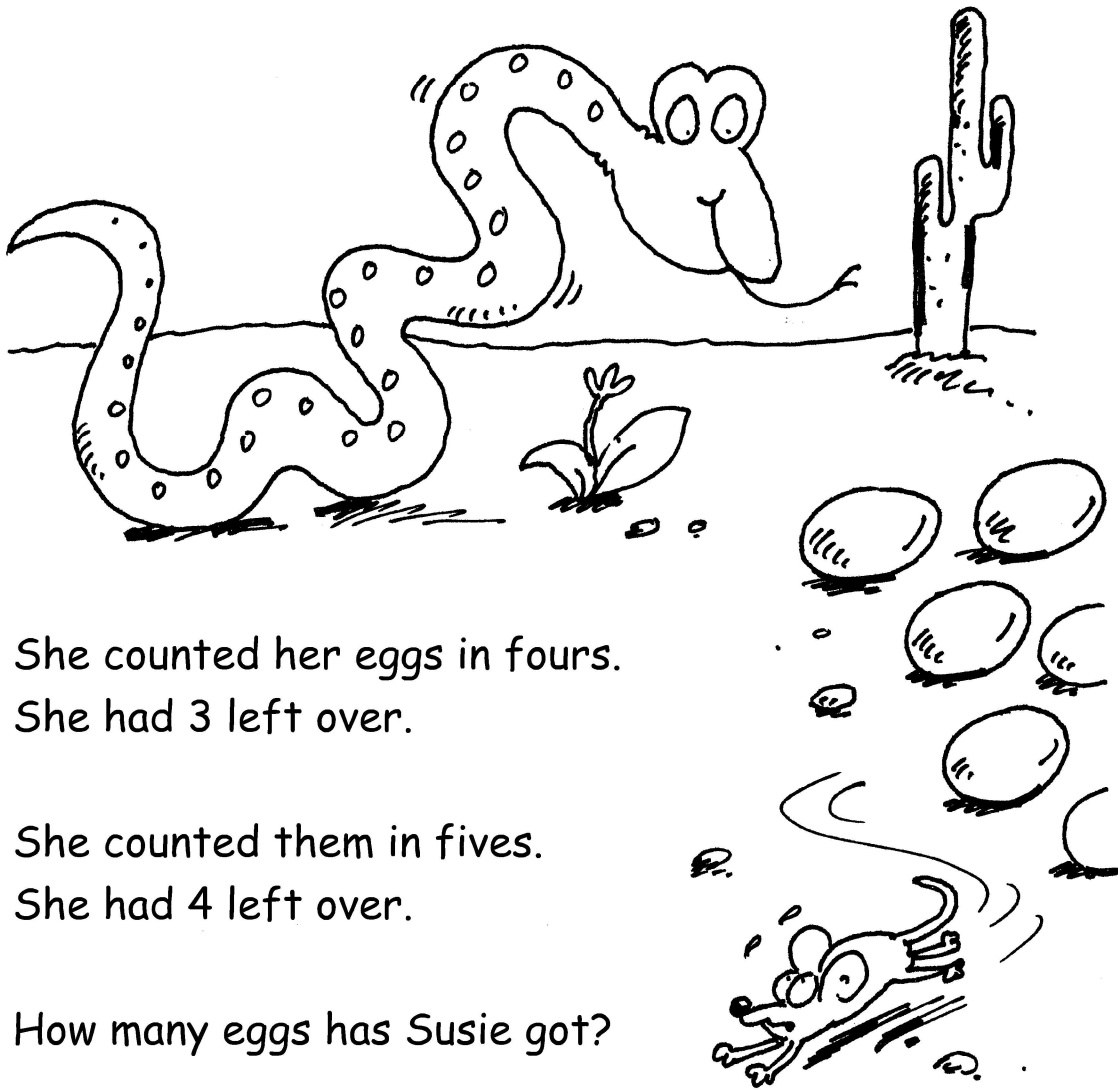
She counted her eggs in fours.
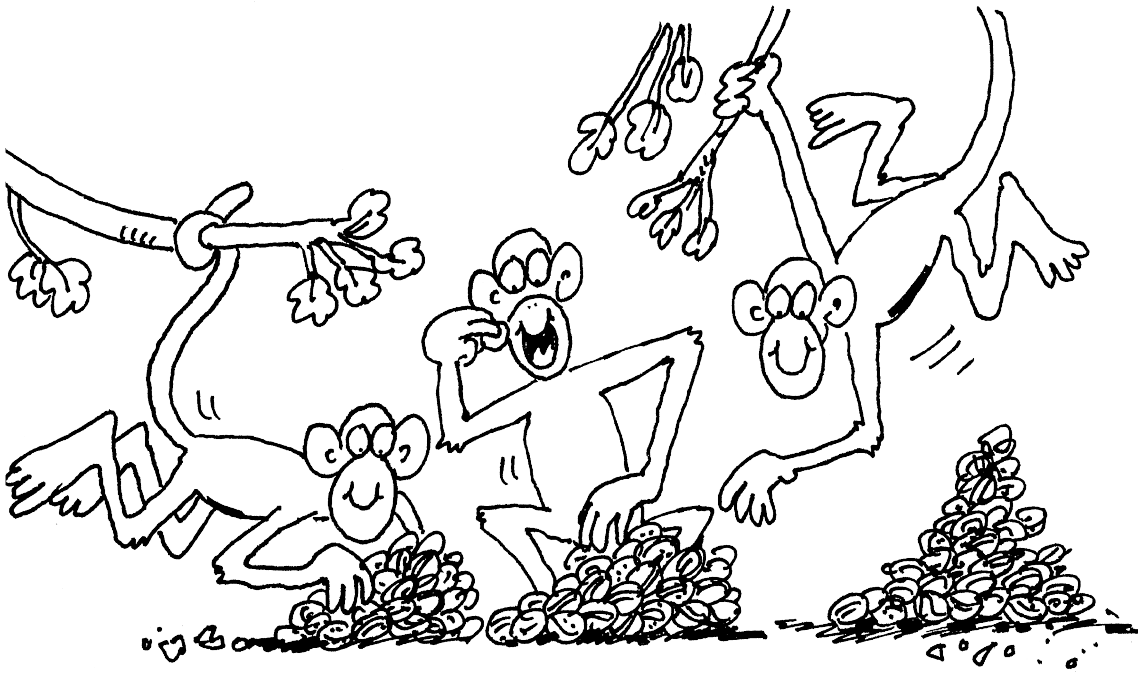She had 3 left over.

She counted them in fives.
She had 4 left over.

How many eggs has Susie got?

Three monkeys

Three monkeys ate a total of 25 nuts.

Each of them ate a different odd number of nuts.

How many nuts did each of the monkeys eat?
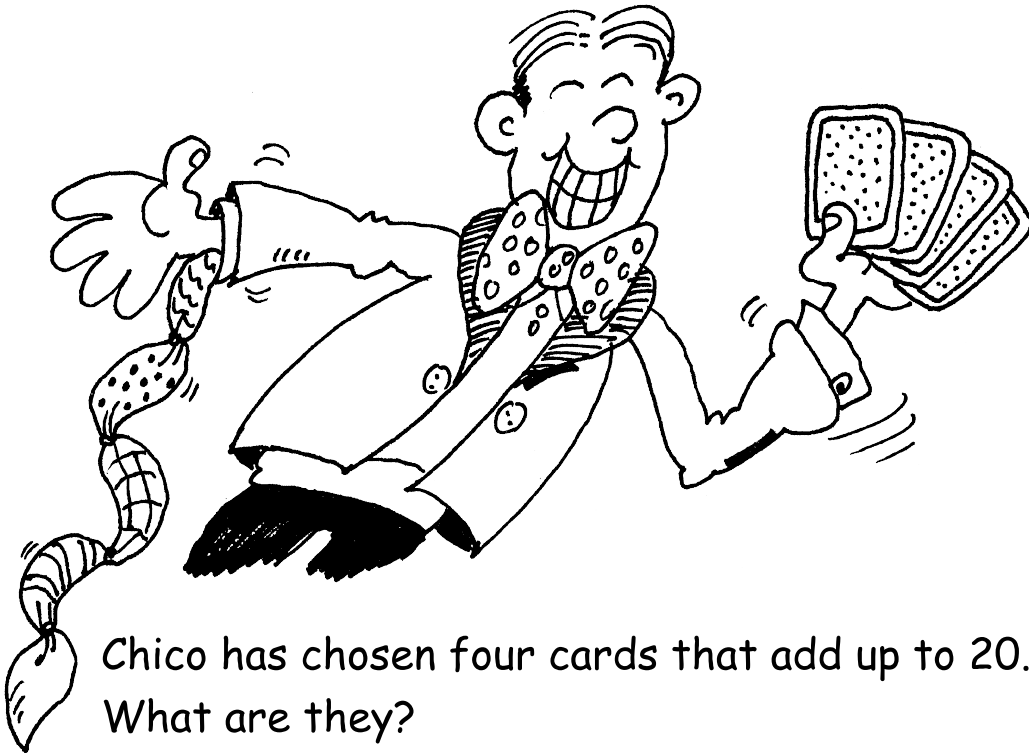
Find as many different ways to do it as you can.

31

Card tricks

Chico's cards are all different.
There is a number from 1 to 8 on each card.

Chico has chosen four cards that add up to 20.
What are they?
There are seven different possibilities.
Try to find them all.

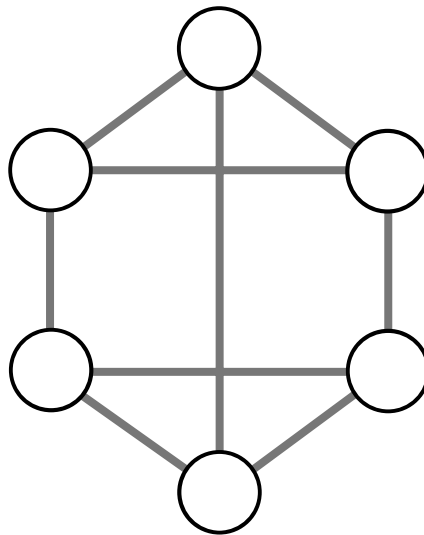What if Chico has three cards that add up to 16?

Neighbours

Use each of the numbers 1 to 6 once.
Write one in each circle.

Numbers next to each other must not be joined.
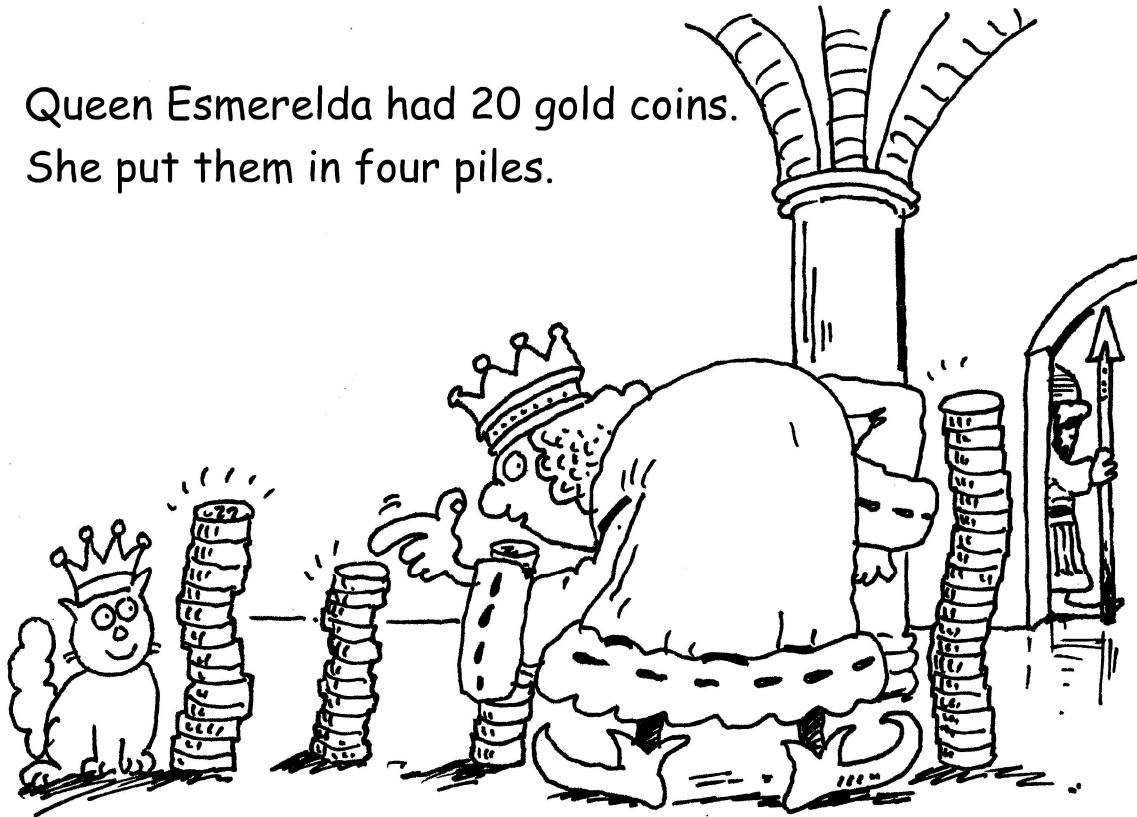For example, 3 must not be joined to 2 or 4.

1   2   3   4   5   6

33

Queen Esmerelda's coins

Queen Esmerelda had 20 gold coins.
She put them in four piles.

◆ The first pile had four more coins than the second.
◆ The second pile had one less coin than the third.
◆ The fourth pile had twice as many coins as the second.
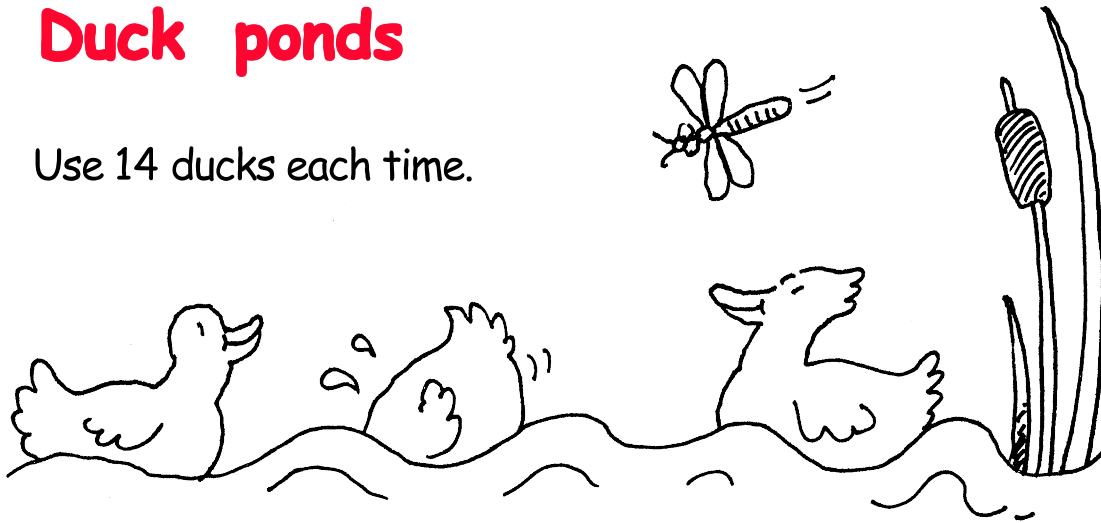
How many gold coins did Esmerelda put in each pile?
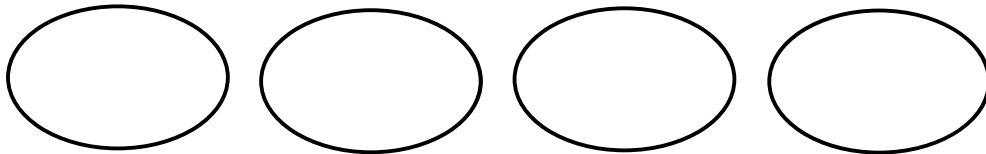
34

Teaching objectives

Solve mathematical problems or puzzles.
Use vocabulary of comparing and ordering numbers.
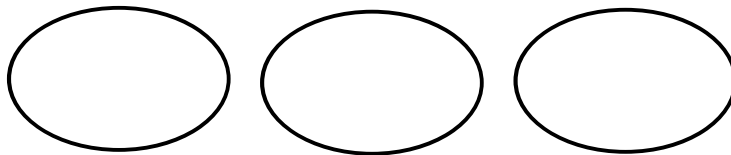Explain methods and reasoning.
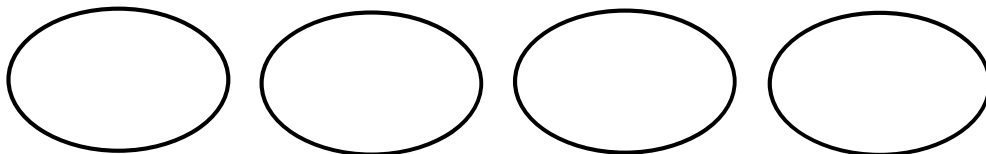
Duck ponds

Use 14 ducks each time.

1. Make each pond hold two ducks or five ducks.

$\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$

2. Make each pond hold twice as many ducks as the one before.

$\bigcirc$ $\bigcirc$ $\bigcirc$

3. Make each pond hold one less duck than the one before.

$\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$

35

Treasure hunt

Jed and Jake are pirates.
Between them they have three precious jewels:
a ruby (R), a diamond (D) and an emerald (E).

Complete the table.
Show what jewels each pirate could have.

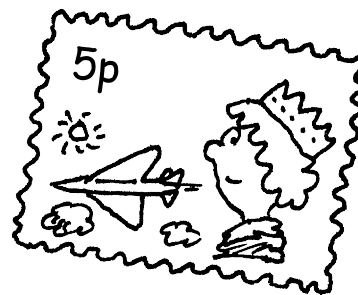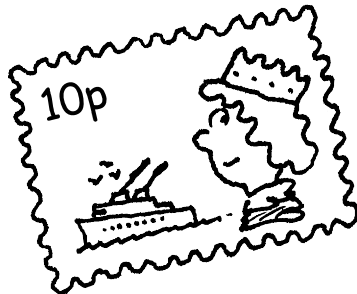| Jed	®						
Jake	©E ©D						

Stamps

Tilly's parcel cost 55p to post.

She stuck on eight stamps.
Each stamp was either 10p or 5p.

How many of each stamp did Tilly stick on her parcel?

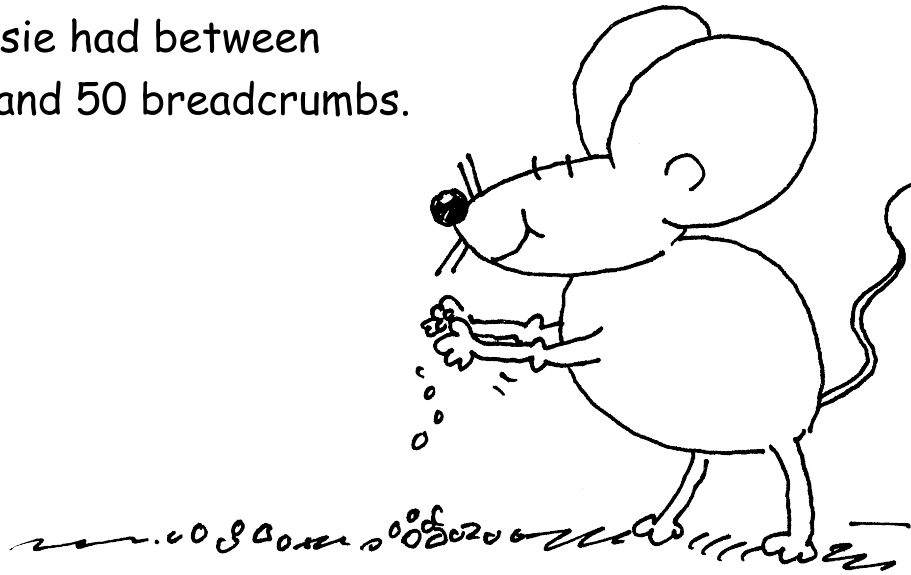Make up your own puzzle like this.
Ask a friend to do it.

37

Maisie the mouse

Maisie had between
30 and 50 breadcrumbs.

She counted the breadcrumbs in fours.
There were 2 left over.

She counted them in fives.
There was 1 left over.

How many breadcrumbs did Maisie have?

38

Kieron's cats

Kieron has three cats.
Each is a different weight.

The first and second weigh 7 kg altogether.
The second and third weigh 8 kg altogether.
The first and third weigh 11 kg altogether.
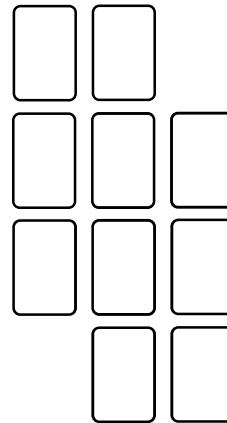
What is the weight of each cat?

39

Next door numbers

Take ten cards numbered 0 to 9.

Arrange the cards like this.

Do it so that no two consecutive numbers are next to each other, horizontally, vertically or diagonally.

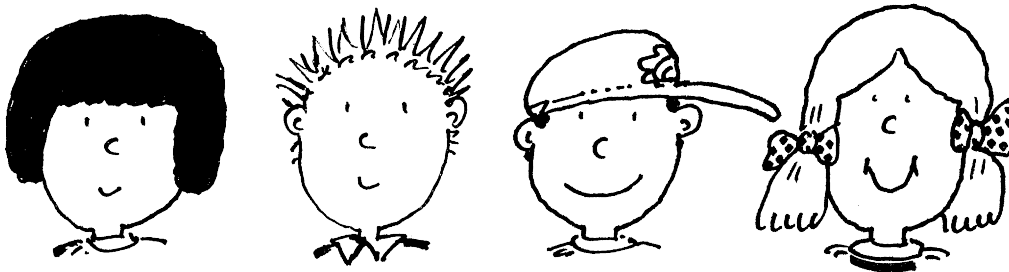There are lots of ways to do it.
How many ways can you find?

40

Nick-names

Dawn, Mark, Josh and Tina are friends.

They each have a nick-name.

Their nick-names are Spider, Curly, Ace and Fudgy, but not in that order.

What is the nick-name of each of the friends?

Clues

◆ Josh plays tennis with Curly and goes swimming with Ace.

◆ Tina has been on holiday with Curly but travels to school with Fudgy.

◆ Spider, Curly and Dawn play in the football team.
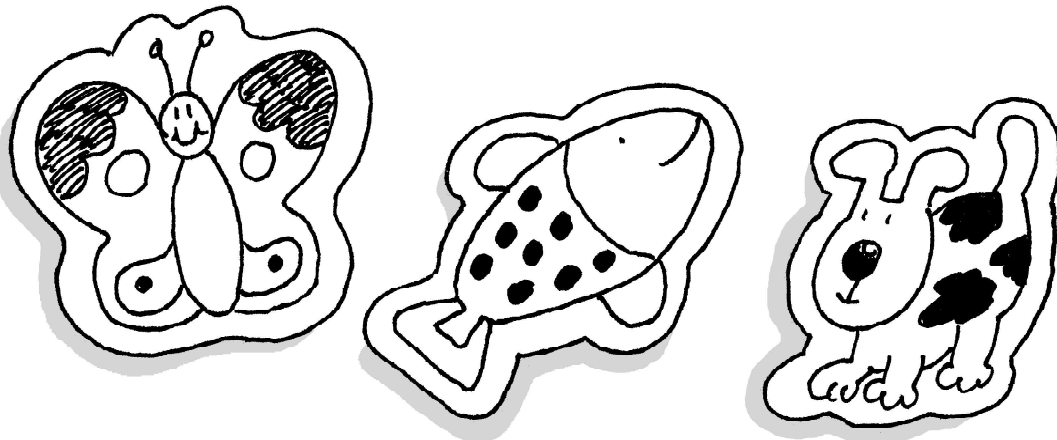
◆ Spider sometimes goes to tea with Josh.

41

Stickers

The twins collected some animal stickers.
They each had the same total number.

Winston had 3 full sheets and 4 loose stickers.
Wendy had 2 full sheets and 12 loose stickers.

Every full sheet has the same number of stickers.
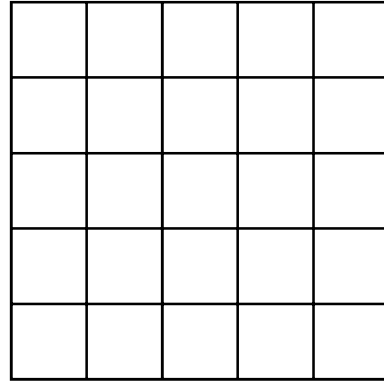How many stickers are there in a full sheet?

42

Odds and evens

You need 13 counters or coins.

Draw a 5 by 5 grid.

Put counters on it.

You can put only one counter in each space.

1. Place 13 counters.

    Get an **odd** number of them in each row and column and the two main diagonals.

2. Place 10 counters.

    Get an **even** number of them in each row and column and the two main diagonals.

43

Mathematical challenges for able pupils

in Key Stages 1 and 2

Illustrations by Graham Round