

**Mathematical challenges  
for able pupils**

**Year 3 B Securing number facts,  
understanding shape**



# 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.



## Learning Objective:

- Solve mathematical problems or puzzles.
- Know addition and subtraction facts up to 20.
- Add three or four small numbers mentally.

# Card tricks

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



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

What are they?  
There are five different possibilities.  
Try to find them all.



Learning Objective:

- Solve mathematical problems or puzzles.
- Know addition and subtraction facts up to 20.
- Add three or four small numbers mentally.

# Extension Card tricks

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



**What if Chico has four cards that add up to 18?**

What are they?  
There are at least 7 different possibilities.  
Try to find them all.



## Learning Objective:

- Solve mathematical problems or puzzles.
- Know addition and subtraction facts up to 20.
- Add three or four small numbers mentally.

## Extension Card trick 2

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



**How many different numbers  
between can you make with four  
cards?**



Learning Objective:

- Solve mathematical problems or puzzles.
- Know addition and subtraction facts up to 20.
- Add three or four small numbers mentally.

# Solution to Card Tricks

Systematic working helps to make sure that all possibilities have been considered.

Four different cards with a total of 20 are:

1, 4, 7, 8 2, 3, 7, 8 3, 4, 5, 8

1, 5, 6, 8 2, 4, 6, 8 3, 4, 6, 7

2, 5, 6, 7

Three different cards with a total of 16 are:

1, 7, 8 2, 6, 8 3, 5, 8 4, 5, 7

3, 6, 7



## Learning Objective:

- Solve mathematical problems or puzzles.
- Know addition and subtraction facts up to 20.
- Add three or four small numbers mentally.

# Card Tricks Extensions

You could try other totals. For example, four cards with a total of 18 are:

1, 2, 7, 8                      2, 3, 6, 7                      3, 4, 5, 6

1, 3, 6, 8                      2, 4, 5, 7                      1, 4, 5, 8

1, 4, 6, 7

Explore the different totals that can be made with four cards. (It is possible to make any total from 10 to 26.)



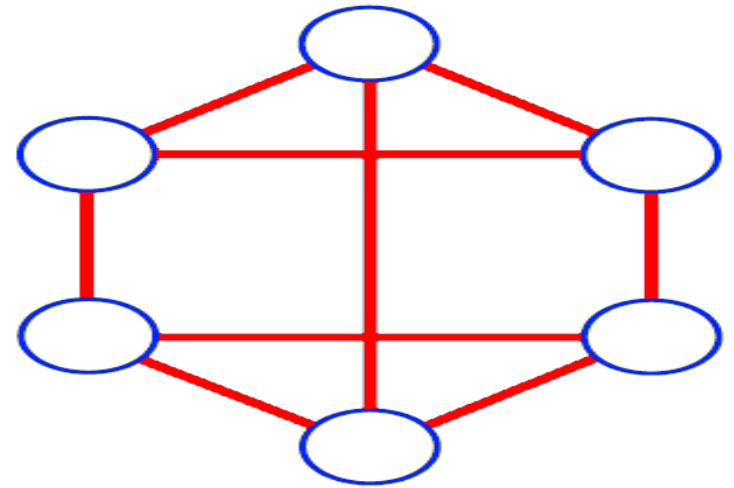
## Learning Objective:

- Solve mathematical problems or puzzles.
- Know addition and subtraction facts up to 20.
- Add three or four small numbers mentally.



# 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**



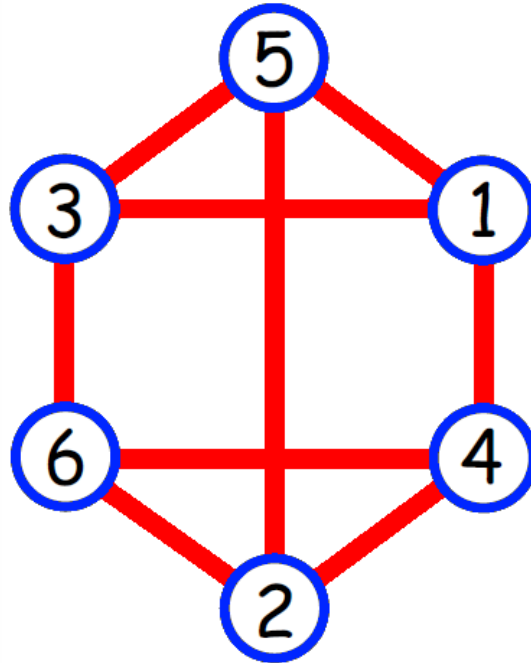
Learning Objective:

- Solve mathematical problems or puzzles.
- Know addition and subtraction facts up to 20.
- Add three or four small numbers mentally.



# Solution to Neighbours

Here is one possible solution.



Can you find others?



Learning Objective:

- Solve mathematical problems or puzzles.
- Know addition and subtraction facts up to 20.
- Add three or four small numbers mentally.

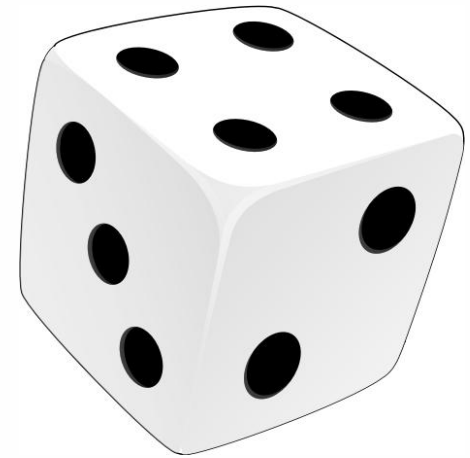
# Roly poly

**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?**



Learning Objective:

- Solve mathematical problems or puzzles.
- Add three or four small numbers.
- Explain methods and reasoning.

# Roly Poly

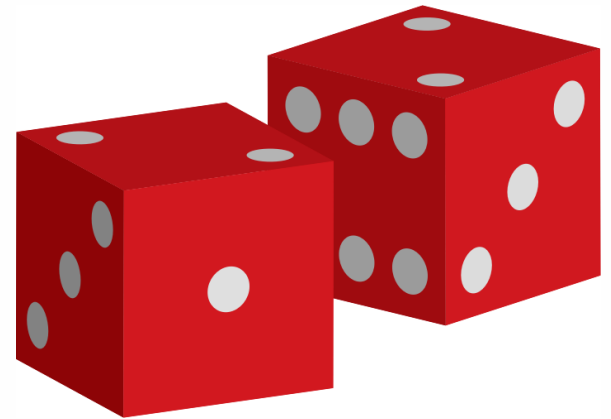
**The dots on opposite faces of a dice add up to 7.**

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?



Learning Objective:

- Solve mathematical problems or puzzles.
- Add three or four small numbers.
- Explain methods and reasoning.

# Solution to Roly Poly

1. The total number of dots on the dice is 21. Of these dots 17 are showing, so the **face with 4 dots is face down.**
2. The total number of dots on two dice is 42, so 12 dots are hidden. **The two hidden faces must each have 6 dots.**



## Learning Objective:

- Solve mathematical problems or puzzles.
- Add three or four small numbers.
- Explain methods and reasoning.

**The end, thank you!**



# References and additional resources.

The questions from this PowerPoint came from:

Mathematical challenges for able pupils in Key Stages 1 and 2

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# Thank You

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These units were organised using advice given at:

[http://www.edu.dudley.gov.uk/numeracy/problem\\_solving/Challenges%20and%20Blocks.doc](http://www.edu.dudley.gov.uk/numeracy/problem_solving/Challenges%20and%20Blocks.doc)

