

2 A MATHEMATICIAN'S GUIDE TO PROBLEM SOLVING

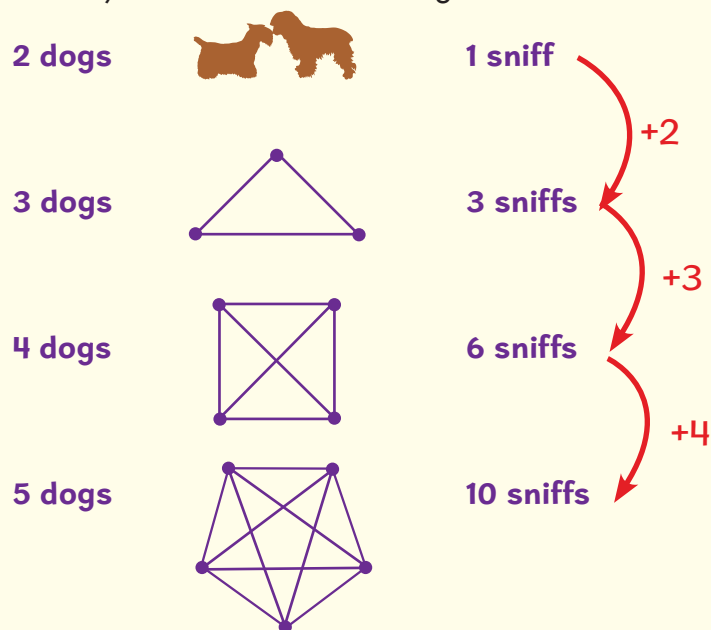
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Method 1 – Drawing a diagram or looking for patterns.

Some problems are simplified by drawing a diagram.

Example

Five dogs arrived at a dog park.
Each dog sniffed every other dog's nose.
How many sniffs were there altogether?



There were 10 sniffs altogether.

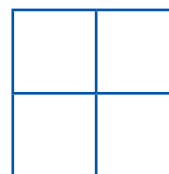
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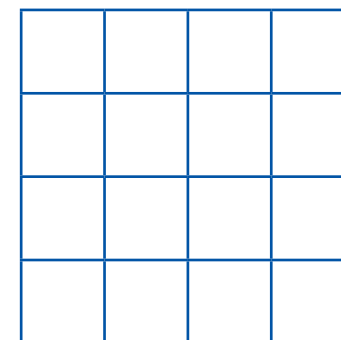
How many sniffs would there be if ten dogs met in a park and each dog sniffed every other dog's nose?

2 How many squares like A are in a 4 × 4 grid like B.

A



B

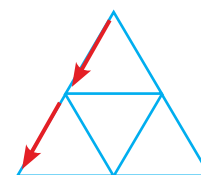


3 How many different ways can be taken to get from P to the bottom of the board?

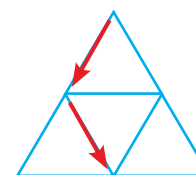
1 row = 2 ways



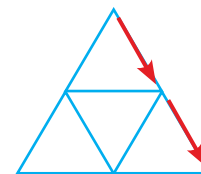
2 rows = 4 ways



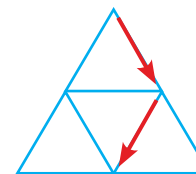
Way 1



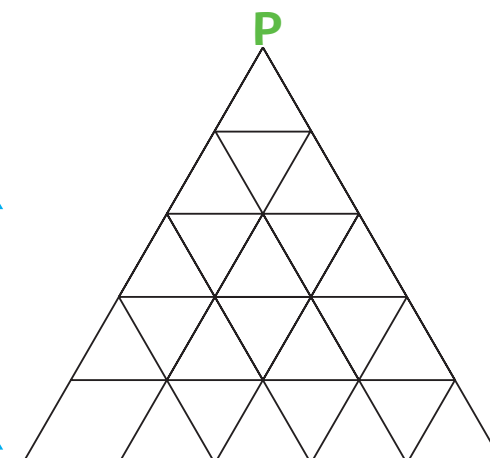
Way 2



Way 3



Way 4



You **cannot** move horizontally.



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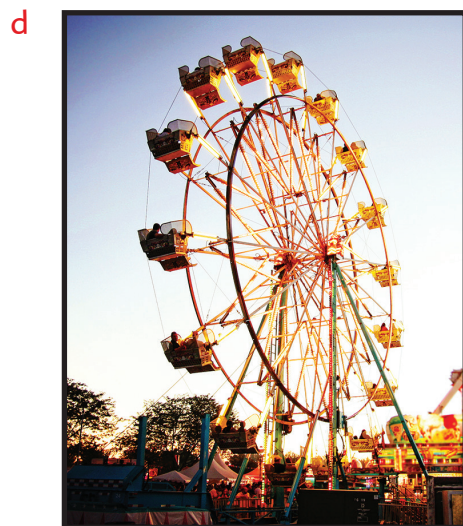
Method 2 – Using trial and improvement.

- 1 a Max and Jess have \$24 between them to spend at a fair.
Max has \$2 more than Jess.
How much do they each have to spend?

- b Max, Jess and Sam won 25 chocolates on the chocolate wheel.
How could they share this out so that each of them has a different number of chocolates?



- c Jess won \$9 less than Max and \$4 more than Sam on one game at the fair.
Together they won \$35.
How much did they each win?



At the fairground Jess saw twice as many people queueing for the Big Dipper as the Ferris Wheel.
She saw 15 fewer people in the Ferris Wheel queue than the Gyro Tower queue.
If she saw 20 people in the Gyro Tower queue, how many did she see in the Big Dipper queue?

How would you choose to solve these problems?

- 2 a A jetty in the Marlborough Sounds has 15 posts at equal distances apart.
The jetty is 42 m long.
How far apart are the posts?
- b Max, Jess and Sam went for a 2 km walk along the beach.
Sam is 100 m behind Max.
Jess is 120 m ahead of Sam.
i Who is in front?
ii How far in front of the next person is this front person?
- c The mail boat in the Marlborough Sounds visited the Youngs' jetty, the Jones' jetty and the Parkers' jetty in that order.
The Youngs live 12 km by boat from the Parkers and the Parkers' jetty is 4 km from the Jones' jetty.
How far is it from the Youngs' jetty to the Jones' jetty?
- d There is a raft at one of the houses the mail boat visits.
The raft is square and has 24 flags at equal spaces around its perimeter.
If there is a flag on each corner, how many flags are along each side?
- e Max went with his family on a sea kayaking holiday.
They kayaked 1 km on the first day, 2 km on the second day, 4 km on the third day and so on.
i How far did they kayak on the sixth day?
ii How far did they kayak in total over the six days?

