



# INVESTIGATION



19 miles



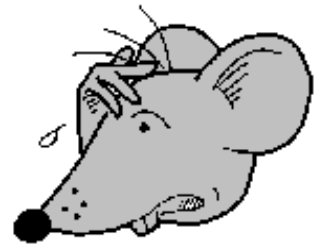
I love long distance running!

Do you?

# MathSphere

## 19 miles Investigation

### Starter



All three of us have got to go on a 19 mile cross country relay. We each have to run part of the relay - **but the number of miles we each run has to be an odd number.**

**Can you help them out?**

**There are 3 runners.**

**Each runner has to run an odd number of miles.**

**They have to run a total of 19 miles.**

**How many different ways can they do this?**



Well, I could run 17 miles and they could run 1 mile each!



## Answer Guide

Here are some possible answers and notes for guidance.

A number line from 1 - 20 might be very useful for this investigation.

There are quite a lot of possibilities for this investigation but if children are confident with odd numbers and systematic in their approach it would not take too long. A class introduction would help with this.

Work through all the possibilities of runner 1 only running 1 mile and then..

Runner 1	Runner 2	Runner 3
1	1	17
1	3	15
1	5	13
1	7	11
1	9	9
1	11	7
1	13	5
1	15	3
1	17	1
3	1	15
3	3	13
3	5	11
3	7	9
3	9	7
3	11	5
3	13	3
3	15	1
5	1	13
5	3	11
5	5	9
5	7	7
5	9	5

Runner 1	Runner 2	Runner 3
5	11	3
5	13	1
7	1	11
7	3	9
7	5	7
7	7	5
7	9	3
7	11	1
9	1	9
9	3	7
9	5	5
9	7	3
9	9	1
11	1	7
11	3	5
11	5	3
11	7	1
13	1	5
13	3	3
13	5	1
15	1	3
15	3	1
17	1	1

### **Answer Guide (Contd)**

If the initial investigation is completed there are a number of other areas that can be considered.

Encourage again the enquiring questions, such as "What would happen if"

And some of these could be considered:

1. Allowing the runners to run odd or even distances.
2. Changing the odd numbers to even numbers.
3. Changing the number of miles run.
4. Changing the number of runners.