

Maths- Greater depth challenges

These are challenges which are targeted at those students wanting to achieve greater depth, or to aim towards.

1. Highest and lowest.

Put operations signs (+ or – or × or ÷) between the numbers 3, 4, 5, 6 to make the highest possible number and lowest possible number.

How about trying with numbers 1, 2, 3, 4, 5 and 6?



2. Consecutive numbers.

This investigation uses the idea of consecutive numbers and gives us other numbers to explore. You may very well discover things that NO ONE else has discovered or written about before, and that's GREAT!

So this is how it starts. You need to choose any four consecutive numbers and place them in a row with a bit of a space between them, like this:

4 5 6 7

When you've chosen your consecutive numbers, stick with those same ones for quite a while, exploring ideas before you change them in any way. Now place + and – signs in between them, something like this :

$$4 + 5 - 6 + 7$$

$$4 - 5 + 6 + 7$$

and so on until you have found all the possibilities. Are you sure you've got them all? You should include one using all +'s and one that includes all –'s.

Now work out the answers to all your calculations (e.g. $4 - 5 + 6 + 7 = 12$ and so on).

Now try other sets of four consecutive numbers and look carefully at the sets of answers that you get each time.

Are you surprised by anything you notice?

It is probably a good idea to write down your 'noticings'. This can lead you to test some ideas out by starting with new sets of consecutive numbers and seeing if the same things happen in the same way.

You might now be doing some predictions that you can test out...

FINALLY, it is good to ask the question "I wonder what would happen if I ... ?"

You may have thought up your own questions to explore further. Here are some I thought of:

"What would happen if I took the consecutive numbers in an order going down, instead of up?"

"What would happen if I only used sets of three consecutive numbers?"

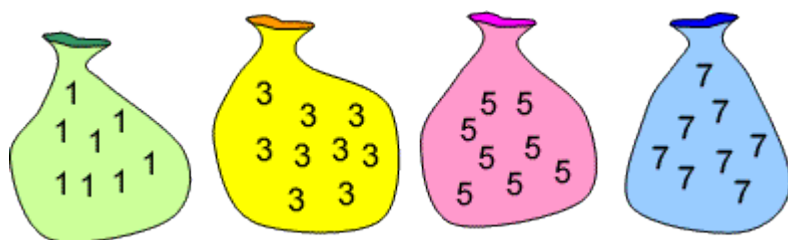
"What would happen if I used more consecutive numbers?"

"What would happen if I changed the rule and allowed consecutive numbers to include fractions or decimals?"

"What would happen if I allowed a + or - sign before the first number?"

3. Make 37

Four bags contain a large number of 1s, 3s, 5s and 7s.



Can you pick ten numbers from the bags that add up to 37?