

Order Matters!

Let's play a little game. We'll give you a starting number and an ending number, and some operations. You have to figure out what order to do the operations in in order to get the ending number.

Example

Start: 7

End: 5

Divide by 4, multiply by 3, subtract 1

Answer: $7 \times 3 = 21$ $21 - 1 = 20$ $20/4 = 5$

1) See how many of the following challenges you can solve. Show your work neatly!

- a) Start: 2 End: 32 Subtract 1, add 1, multiply by 11
- b) Start: 17 End: 6 Subtract 9, add 2, divide by 2
- c) Start: 29 End: 43 Multiply by 8, subtract 14, add 13, divide by 4
- d) Start: 1 End: 1 Divide by 2, multiply by 7, subtract 4, add 3
- e) Start: 49 End: 50 Square the number, subtract 14, add 1, divide by 7
- f) Start: 196 End: 30 Multiply by 17, divide by 8, take the square root, add 2
- g) Start: 13 End: 14 Add 10, raise to the 5th power, add 3, divide by 3, divide by 8

2) Explain your strategies for Part 1. Who did you work with or check your work with? What made a problem easy or difficult? Were there short-cuts?

3) How many possible orders are there depending on the number of steps in the instructions? Explain!

4) Create an "Order Matters" problem of your own and try it out on someone. How did it go?

5) Problem (d) starts and ends with 1. Can you use the operations in that problem to start with any number and cycle back to it? Can you create an Order Matters problem that will cycle back to any starting number?

6) Challenge! Start with a number between 1 and 9—you figure out which! End with 12. Multiply by 2, add 8, multiply by 7, take the square root

7) Have fun!