

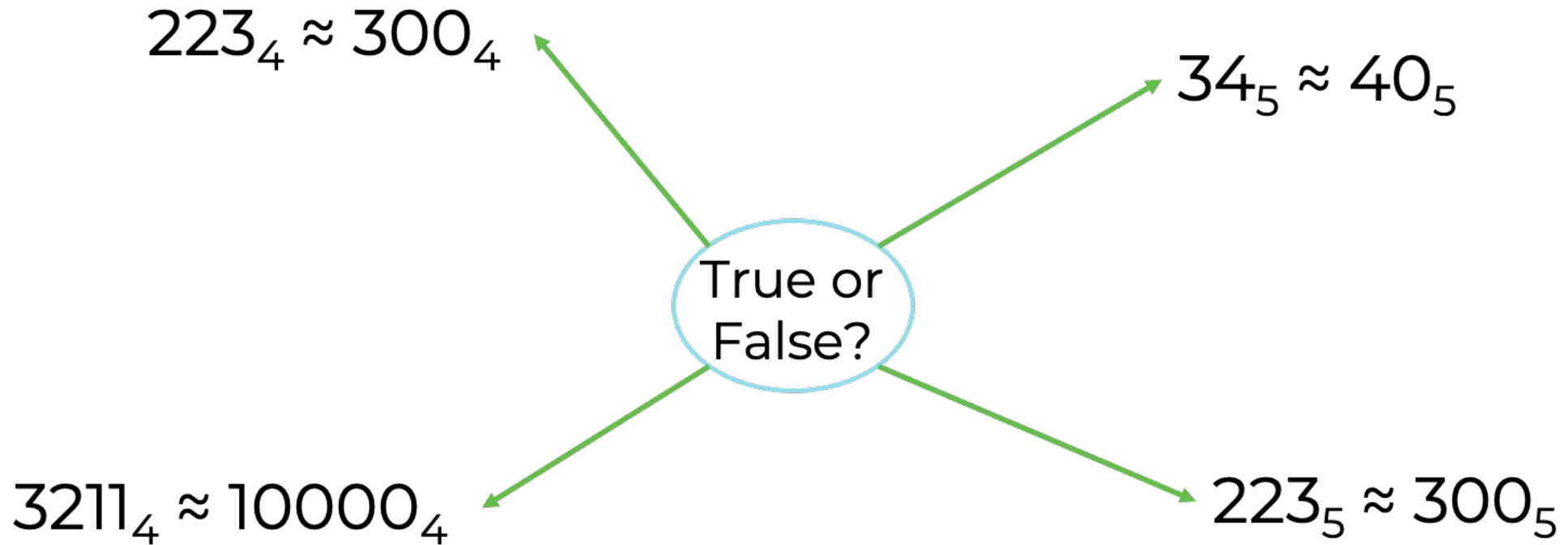
Mathematics

Operations in different bases

Mr Maseko



Try this



Which base is easiest to round in?



Try this

Subtraction in base 7

$$\begin{aligned}10 - 1 &= 6 \\10 - 3 &= 4 \\100 - 20 &= 50\end{aligned}$$

Why?

| 243s | 49s | 7s | 1s |
|------|-----|----|----|
| | | | |
| | | | |

$$100 - 1$$

$$1000 - 1$$

$$100 - 11$$

$$1000 - 11$$

What connections/patterns do you see?



Try this

$$100 - 1$$

$$1000 - 1$$

$$100 - 11$$

$$1000 - 11$$



Try this

Number bonds in Base 3, 4, and 5.

Base 3

| | | |
|---|----|----|
| + | 1 | 2 |
| 1 | 2 | 10 |
| 2 | 10 | 11 |

Base 4

| | | | |
|---|---|---|---|
| + | 1 | 2 | 3 |
| 1 | | | |
| 2 | | | |
| 3 | | | |

Base 5

| | | | | |
|---|---|---|---|---|
| + | 1 | 2 | 3 | 4 |
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |

Draw a number bonds table for base 7.



Try this

Use the example of this addition in base 4 to work out the answers to these addition in base 4.

$$\begin{array}{r} 323 \\ + 232 \\ \hline 1221 \\ \hline 1\ 1 \end{array}$$

$$23 + 31$$

$$33 + 21$$

$$1230 + 3210$$

$$203 + 1331$$

$$\begin{array}{r} 323 + \\ 333 \end{array}$$

$$31 + 203 + 33$$

Check you answers by converting back to base 10.
Try the same calculations in base **8**. What are the similarities?



Try this

The digits of base 12 are:

0 1 2 3 4 5 6 7 8 9 A B

Task 1: True or False?

$$7 + 7 = 12$$

$$A + B = 19$$

$$1A - B = B$$

Task 2: Working in base 12, calculate:

$$536 + ABA$$

$$100 - A7$$

$$6BA + 5AB$$

$$BBB + A87$$

$$ABBA + BAAB$$

$$BAB - ABA$$



In imperial measures, there are 12 inches in a foot.
Before decimal money, there were 12 pennies in a shilling.
Why do you think base 12 was commonly used?

