The Collapsing Bridge Puzzle

Collapsing Bridge

A bridge will collapse in 17 minutes.

4 people want to cross it before it will collapse. It is a dark night and there is only one torch between them.

Only two people can cross at a time.

"A" takes a minute to cross.

"B" takes 2 minutes.

"C" takes 5 and "D" takes 10 minutes

How do they all cross before the bridge collapses?

Find the value of the letters

ABC + DEF = GHIJ

24 Puzzle

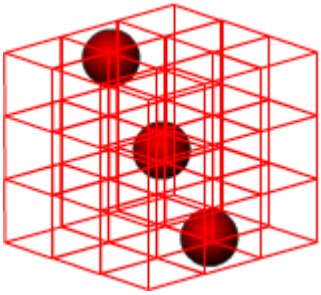
How can I get the answer 24 by only using the numbers 8,8,3,3?

You can use add, subtract, multiply, divide, and brackets.

Bonus rules: also allowed are logarithms, factorials and roots.

Marbles in a Box

Imagine a three dimensional version of noughts and crosses where two players take it in turn to place different coloured marbles into a box. The box is made from 27 transparent unit cubes arranged in a 3-by-3-by-3 array. The object of the game is to complete as many winning lines of three marbles as possible.



How many different winning lines are there?

Divisors

The list below shows the first ten numbers together with their divisors (factors):

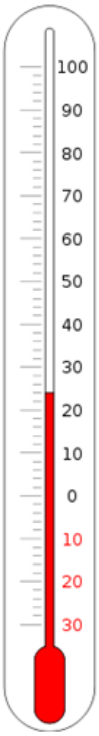
1. 1
2. 1, 2
3. 1, 3
4. 1, 2, 4
5. 1, 5
6. 1, 2, 3, 6
7. 1, 7
8. 1, 2, 4, 8
9. 1, 3, 9
10. 1, 2, 5, 10

What is the smallest number with exactly twelve divisors?

What is the smallest number with exactly fourteen divisors?

Temperature

Temperature is often measured in degrees Celsius, ^{o}C, or degrees Fahrenheit, ^{o}F.



The freezing point of water is 0 ^{o}C and 32 ^{o}F.

The boiling point of water is 100 ^{o}C and 212 ^{o}F.

Is there a temperature at which Celsius and Fahrenheit readings are the same?

Can you describe a way of converting Fahrenheit readings into Celsius?

Can you describe a way of converting Celsius readings into Fahrenheit?

An extension challenge:

Scientists often use the Kelvin scale of temperature, where the freezing point of water is 273.1 and the boiling point of water is 373.15 K.

Is there a temperature at which Kelvin and Fahrenheit readings are the same?

Is there a temperature at which Kelvin and Celsius readings are the same?

Can you describe ways of converting Kelvin readings into Fahrenheit and Celsius readings?