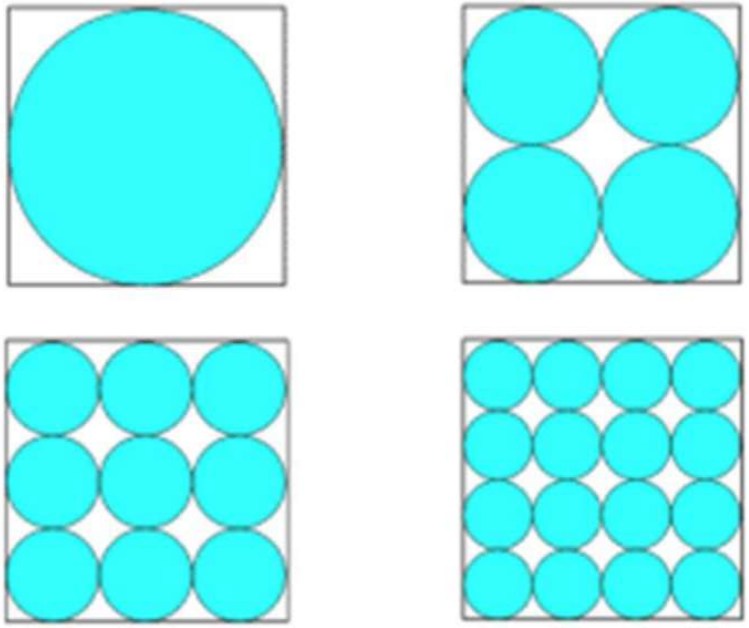
# Four Short Problems

## Circles

In the images below the square has a side length of 1 unit.

Which of the images has the greatest area covered by circles?



# Four Short Problems

## Petrol Tank

Andrea's car has a petrol tank that holds 44 litres of petrol.

She goes to the petrol station when her tank is a quarter full and fills it up until it is two thirds full.

How many litres of petrol does she put into the car's petrol tank?

# Four Short Problems

## Peaches

A monkey has 75 peaches

Each day he: keeps a fraction of his peaches
gives some away
eats 1 peach

These are the fractions he decided to keep.

$$\frac{1}{2} \quad \frac{1}{4} \quad \frac{3}{4} \quad \frac{3}{5} \quad \frac{5}{6} \quad \frac{11}{15}$$

In what order did he use the fractions so that he was left with just one peach at the end?

# Four Short Problems

## Integers

What is the integer $x$

so that $\frac{x}{9}$

lies between $\frac{71}{7}$ and $\frac{113}{11}$ ?

# Four Short Problems


Follow the link to the solutions

# Fractions of a 1000

What is $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{4}{5}$ of $\frac{5}{6}$ of $\frac{6}{7}$ of $\frac{7}{8}$ of $\frac{8}{9}$ of $\frac{9}{10}$ of 1000 ?

If you like this challenge then you can play an interactive challenge on Nrich - Level 4!

# Fractions of 1000

Follow the link to the solutions

# Unit Fractions

Remember the Egyptians and their unit fractions? Now it's time to explore this further……

A unit fraction is a fraction that has a numerator of 1.

Other fractions can be written as the sum of two unit fractions.

Here are some examples some of which are correct and some which are not – can you find which ones are correct?

$\frac{1}{2}=\frac{1}{3}+\frac{1}{6}$ $\frac{1}{2}=\frac{1}{10}+\frac{1}{20}$ $\frac{1}{3}=\frac{1}{4}+\frac{1}{12}$ $\frac{1}{3}=\frac{1}{7}+\frac{1}{21}$ $\frac{1}{4}=\frac{1}{5}+\frac{1}{20}$

What rules might have been used to generate these?

Thinking about those that are correct what rule might you suggest for generating other unit fractions from the sum of two others ?

**Some unit fractions can be made in more than one way …..**

Here are some to start you off $\frac{1}{6}=\frac{1}{7}+\frac{1}{42}$ $\frac{1}{6}=\frac{1}{8}+\frac{1}{24}$ can you find more ways to make $\frac{1}{6}$?

Can you finish this sum for $\frac{1}{8}$ and find more? $\frac{1}{8}=\frac{1}{9}+\frac{1}{\quad}$

Can all unit fractions be made in this way ? Choose different unit fractions to test out your theories.

# Unit Fractions


Follow the link to the solutions