

## Number Nest Weekly Challenge

1. I need a lot of toys. Which of these offers give me the cheapest price for each toy?

- a) Buy 1, get 1 free      b) buy 2, get 2 free      c) buy 3, get 3 free  
d) buy 4, get 4 free      e) there's no difference - they are all the same



Suppose one toy costs 50p with none of the offers. Working through the first four alternatives gives 25p for one toy. So the answer is E.

2. The Olympic Velodrome has a 250m track. How many circuits do the cyclists have to do to complete a 30km race?

120 circuits.

Calculate in metres -  $30000 \div 250 = 120$

Calculate in km: four laps make up one km so the number of circuits is  $4 \times 30 = 120$ .

3. For £2, a stamp machine gives a mixture of 20p and 26p stamps worth a total of £2.02. How many 20p stamps are included?

There must be seven 26p stamps to give a total ending in 2.

$7 \times 26p = £1.82$  and therefore there is only one 20p stamp.

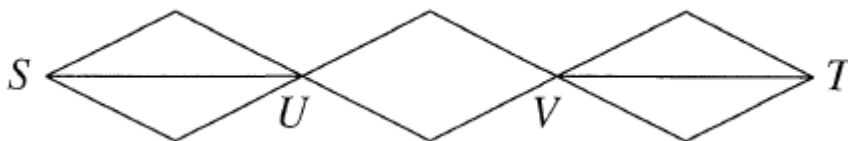
4. A 'double-decker' sandwich has three slices of bread and two layers of filling (bread/filling/bread/filling/bread). Each slice of bread has to be buttered on each side that is in contact with the filling. I make as many of these sandwiches as possible from a sliced loaf which has 22 usable slices, excluding the crusts which are not used. How many sides of bread do I have to butter?

28 sides need to be buttered. Only 21 of the 22 slices may be used and these will make seven 'double-decker' sandwiches. Each sandwich requires four sides of bread to be buttered.

5. What is the sum of all the prime numbers which are less than 25?

$$2 + 3 + 5 + 7 + 11 + 13 + 17 + 19 + 23 = 100$$

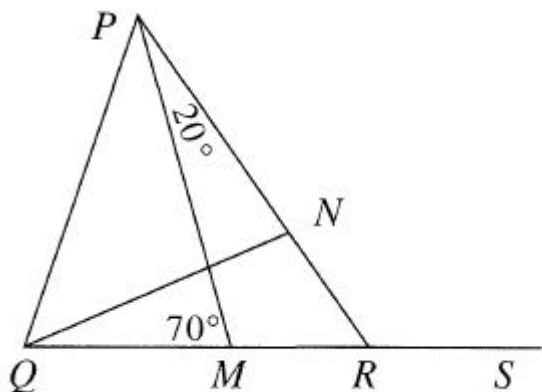
6. How many different routes are there from  $S$  to  $T$  which go through point  $U$  one or less times and go through point  $V$  one or less times?



There are 3 routes from  $S$  to  $U$  and 2 from  $U$  to  $V$ . The number of different routes from  $S$  to  $V$  is therefore  $3 \times 2 = 6$ . Each of these may be followed by any one of three different routes from  $V$  to  $T$ , making a total of  $6 \times 3 = 18$  routes in all.

## Bonus Question

7. In the diagram  $\angle RPM = 20^\circ$  and  $\angle QMP = 70^\circ$ . What is  $\angle PRS$ ?



$\angle PMR = 110^\circ$  (adjacent angles on a straight line);  $\angle PRM = 50^\circ$  (angle sum of a triangle)  
 $\angle PRS = 130^\circ$  (adjacent angles on a straight line).