Question 1:

The odd numbers between -5 and 4 inclusive are paired with the even numbers between -5 and 4 inclusive. N is the sum of the product of the pairs. What is the minimum possible value of N?

Question 2:

A golf ball is hit onto a circular green of radius 12m. Assuming that all landing positions are   equally likely, what is the probability that it lands less than 1m from the hole *(assuming the hole is in the centre of the green)*?

Question 3:

If the solutions of $x^2 + bx + 36 = 0$ are integers, what is the number of integer values that b can have?

Question 4:

If (4, 1) is the midpoint of the interval from (x, -2) to (5, y), what is the value of xy?

Question 5:

A sequence is formed by writing integers the corresponding number of times as follows:

$\{1, 2, 2, 3, 3, 3, 4, 4, 4, 4, 5, 5, 5, 5, 5, ...\}$. What is the 800th term in this sequence?
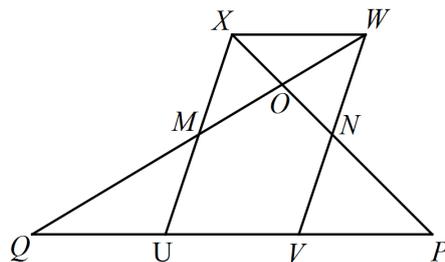
Question 6:

A class consists of 10 boys and 15 girls. Two of the boys and five of the girls are left-handed. Two students are chosen at random form the class. What is the probability that both are
left-handed?

Question 7:

A car 3m long is travelling on a motorway at 110km/h and overtakes a 17m long truck travelling at 100km/h. How long, in seconds, does it take for the car to completely overtake   the truck?

Question 8:

$UVWX$ is a parallelogram with area 24 square centimetres. M and N are the midpoints of UX and VW respectively. XNP and QMW are straight lines. What is the area of triangle QPO, in   square centimetres?

Question 9:

Four spheres of radius 1 are placed on a horizontal plane so that each touches two others and   their centres form a square. A fifth sphere of the same size is placed so that it rests on the other four. What is the height of the highest point on the fifth sphere above the plane?

Question 10:

If the length of a certain rectangle is decreased by 4cm and the width is increased by 3cm, a   square with the same area as the original rectangle would result. What is the perimeter of the   original rectangle?

Question 11:

     At a Wellington secondary school, 15 students were absent on Monday, 12 absent on Tuesday   and 9 absent on Wednesday. If 22 students were absent at least once during these three days,   what is the maximum number of students who could have been absent on all three days?

Question 12:

     A table with p rows and q columns is filled with whole numbers from 1 to pq. They are written   in increasing order, along row 1, then row 2, etc. The number 20 is in the third row, 41 is in the   fifth row and 103 in the last row. What is the value of $p + q$?

Question 1:

A box contains four coins, of which three are normal and one is double-headed. Mia selects a coin at random and tosses it. What is the probability that the coin falls on heads?
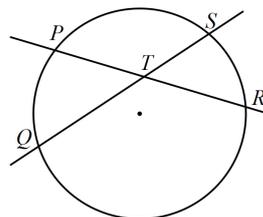
Question 2:

For what values of k do the equations $kx - y = 2$ and $x + y = 3$ have a solution (x, y) in which

$x > 0$ and $y > 0$?

Question 3:

What is the last digit in the sum of $3^{17} + 7^{13}$?

Question 4:

Two intersecting straight lines intersect a circle at the four distinct points P, Q, R and S as shown, with the point of intersection, T, of the lines inside the circle. If angle PTQ is 20° and the radius of the circle is 5cm. What is the sum of the lengths of the arcs PQ and RS, in centimetres?
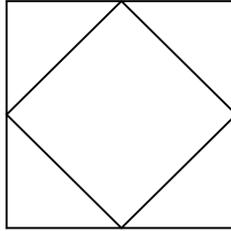

Question 5:

Racehorses *Phar Lap* and *Kingston Town* run a match race over 1 kilometre. *Kingston Town* is given 48 metres start. They run at their own constant speed and *Phar Lap* wins by 2 metres. How many metres had *Phar Lap* run when he passed *Kingston Town*?

Question 6:

A square of side length 4 is given. A second square is obtained by connecting the midpoints of the sides of the first square (as shown in the diagram). If this process of forming smaller inner squares by connecting midpoints of sides of the previous square is continued, what will be the side length of the twelfth square?

Question 7:

Three regular polygons fit exactly together around a point on a plane surface. One is a square and another is a hexagon. How many sides must the remaining polygon have?

Question 8:

A bag contains 100 balls and 95% of them are red. Some of the red balls are removed from the bag and after this 75% of the balls in the bag are red. How many balls were removed from the bag?

Question 9:

A multiplicative magic square has the product of the numbers in each row, column and diagonal the same. If the diagram is filled with positive integers to form a multiplicative magic square, what is the value of x?

5		x
4		
	1	

Question 10:

How many different prime numbers are divisors of $10^4 - 1$?

Question 11:

If the line $y = 2x + 3$ is reflected in the line $y = x + 1$, what is its new equation?

Question 12:

In the figure, the curves $PRSQ$ and ROS are both semi-circles. RS is parallel to PQ. The radius of the larger semicircle is 1 metre. What is the area, in square metres, of the shaded portion?