

Questions

We've found that recent successful applications have scored more than 6 on this self-assessment within around 35 minutes.

If you achieve this or more and enjoy the test then we'd really encourage you to continue with your application. This is a good indication that you'll pass the next stage of the process. If you honestly scored less than this, then it's unlikely you'll pass the next stage.

1. Let n_1, n_2, \dots, n_k be a sequence of k consecutive odd integers.
If $n_1 + n_2 + n_3 = p^3$ and $n_k + n_{k-1} + n_{k-2} + n_{k-3} + n_{k-4} = q^4$ where p and q are primes, then what is k ?

2. Let ABCDEF be a 6 digit number. The following are all true:

1. All the digits are different.
2. The sum of the first two digits is the same as the sum of the last two digits.
3. The sum of all the digits equals the last two digits of the number.
4. The pairs AB, CD and EF are all prime numbers.
5. The sum of the last two digits is less than 10.

What is the number?

3.

B D	V X	P R
□ G	□ A	□ U
K P	E J	Y ?

What is ?

4. Each square contains a letter A-D and a number 1-4.
Each number/letter can only appear once in each row/column.
Each combination of letter and number can only appear once.
What is ?

?		A1	
B2			
	C3		B1

5. If it is 7pm now, what time is it in 47, 999, 995 hours?

6. There are 60 pupils in a year at school, they are divided randomly into 3 classes of 20 pupils each. Alice, Bob and Caroline are all in the school year.

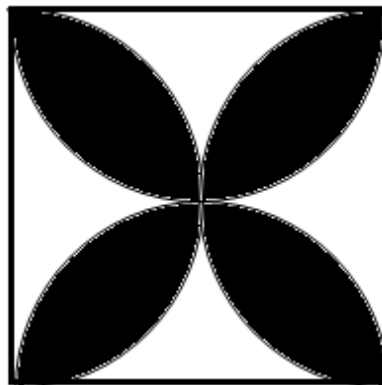
Part 1 - What is the probability that Alice and Bob end up in the same class?

Part 2 - What is the probability that Alice, Bob and Caroline all end up in different classes?

7. I have a 3 digit number. Work it out from the following facts:

1. 406 – one digit is correct and in the wrong place
2. 921 – one digit is correct and in the wrong place
3. 907 – one digit is correct and in the correct place
4. 769 – two digits are correct but both are in the wrong place
5. 540 – all digits are wrong

8. The shaded area below is the common area to four semicircles whose diameters are the sides of the square with side length $4x$. Find the area of the shaded region in terms of x .



9. You have 11 stacks, each with 11 weights, and you know what each weight should weigh. One stack contains only faulty weights. Every faulty weight is 1kg heavier than it should be. You can use a weighing scale once. How do you correctly determine the faulty stack?