

Survivor Series Level 4

Year 7 and 8 students.

Survivor Series 2017

Level 4



For Year 7 and Year 8 students.
Curriculum level 4.

What to do.

For students.

1. You can work with a friend or two friends!
Teams can be different each day.
2. Do the tasks and enter your answers in your maths book and show your teacher.
3. If you are right you will get the next task.
4. If you are wrong, answer the task again.
5. When you have finished each day you will get a code word.
6. At the end of the week you will have 5 code words. Put them together and this will tell you where your school's Maths Week treasure is.
7. Good luck !



Tuesday:
Survivor Series
For Year 7 and Year 8 students

2017

Probability.
Level 4
Curriculum Level 4

Probability.

“Everyone talks about probability.”



“The probability that my football team will win on Saturday is $\frac{1}{3}$. They will either win, lose or draw!”

“The probability I will score a goal at my netball game is $\frac{1}{2}$. I will either score a goal or I will not score a goal.”

“The probability that it will rain tomorrow is 0.4”



What is Probability ?

Probability is a number between 0 and 1.
It is always a fraction!

1 is certain it will happen
0 is certain it will not happen

The formula for probability is



Probability = $\frac{\text{the number of successes}}{\text{the total number of possible outcomes}}$

$$P(X) = N \div T$$

Task One.

The answers to each of these is a number between, or equal to 0 and 1.

- (a) What is the probability that the sun will set today?
- (b) What is the probability that my veggies will taste yummy to-night?
- (c) What is the probability that Christmas day is on January 25th.
- (d) What is the probability that you are reading this?



Task Two.

When a coin is tossed there are two possible results – heads or tails.
The probability the coin will turn up heads is

$$P(\text{heads}) = \text{Heads} \div \text{Tosses} = 1 \div 2 = \frac{1}{2}$$

- (a) Now obtain a coin! Toss your coin 20 times. How many times does it turn up heads? What should it be?
- (b) Toss your coin 40 times. How many times did it turn up heads? What should have it been?



- (c) **Mathematicians like to record their results in tables!**
Try completing this table using your coin.

Write in decimals the P column.

See how close it is to what it should be!

As the number of coin tosses gets bigger do you notice P column getting closer to what it should be?

Number of coin tosses.	Number of heads.	$P = \text{Heads} \div \text{Tosses.}$
20		
40		
60		
80		
100		

Task Three.

There are two types of Probability.
 One is by theory – using the formula.
 The other is by experimenting.

“They don’t always match up, as in your task two.
 It is close, but not exactly the same.”



Find a die!

A die is a single dice!

- (a) Calculate the probability theory that when you toss the die it will turn up with 6 on top. Write this down as a decimal.

- (b) Now try it in experiment.
 Toss the die 60 times.
 How many times would you expect the 6 to turn up?
 How many times did the 6 turn up?



- (c) Is this statement true or false?
 “The more times you toss the die the number of 6’s you get will get closer to what the probability theory says it should be”.

- (d) Test you answer to (c) out.

Task Four.

Find two dice!



- (a) When the two dice are tossed together, list the different combinations you can get with the two dice.
There should be 36 !
- (b) When the two dice are tossed together in how many different ways can they turn up and total 7 ?
- (c) If the two dice are tossed together what is the probability they will turn up with a total of 7 ?
- (d) Try this!
Toss the two dice together a large number of times.
Count how many times they turned up with a total of 7 .
How close was this to the probability theory value?



Task Five.

Jelly Beans!



In this bag of Jelly beans there are 12 blue, 20 yellow, 18 red, 10 orange, 12 green, and 8 black beans.

If I put my hand in the bag what is the probability I will pick out a black bean which is my favourite jelly bean?



Task Six. Magic Probability...

Find a group of 11 students.
Ask each member to write down a letter of the alphabet which they think no one else will write down.

The probability theory that 2 people in the group of 11 students will write down the same letter of the alphabet is 0.9

This is quite high – in fact it is almost certain that two people among your group will have written down the same letter.

You can almost bet your week's pocket money on it !!!

Check it out....



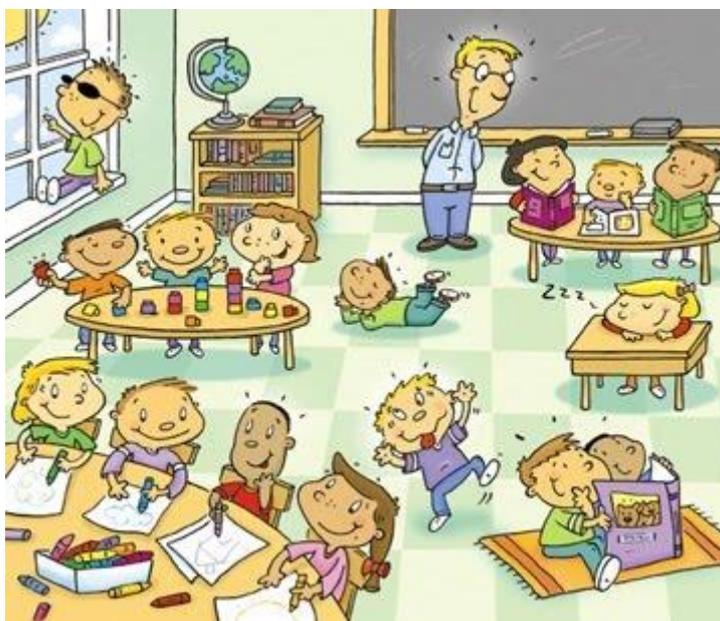
Task Seven. The Birthday Probability.

This is amazing!
It really is !!

If your class has 30 students in it there is a probability of 0.7 that there will be at least two students with birthdays on the same day.

0.7 is quite high so there is a very good chance this will happen.

If your class has 34 students the probability of two with birthdays on the same day is high at 0.8

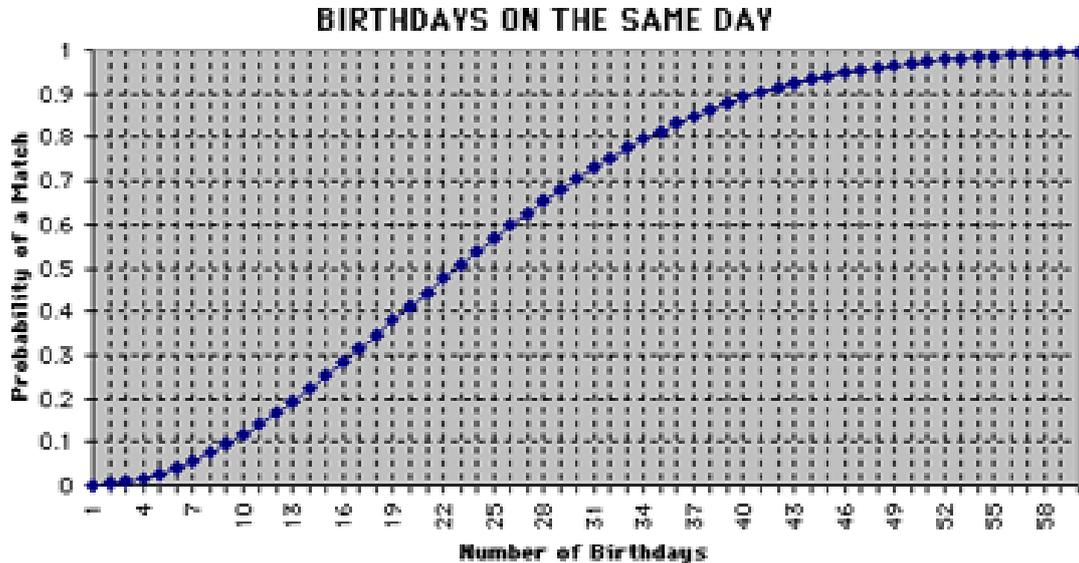


Out of 365 days in the year it is quite amazing to think that in your class of 34 students two students celebrate their birthdays on the same day!

Try your class and see if this is true.

The table below gives the probabilities for different class sizes. It also gives the formula. N is the number of students in the class.

$$P(N) = 1 - (365)(364)(363)\dots(365 - N + 1)/(365)^N$$



To calculate the probabilities using the formula is quite difficult but use the table where it has all been calculated.

If your class is smaller than 30 combine with another class and see whether this probability theory is true for the combined class.

Notice that a group size of 40 the probability is 0.9 This is almost a certainty!!

Task Eight.



1623-1662

Who are these two French mathematicians?

They invented Probability in 1654.

Both mathematicians contacted each other by letter. They never meet despite living near each other. One lived in Paris the other in Toulouse.



1601-1665

“Probability helps us to make predictions!”