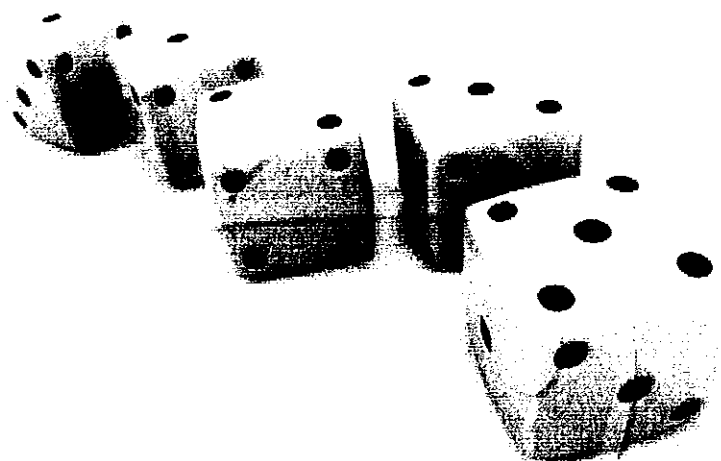


Sequences 4: Pascal's Triangle

<http://www.youtube.com/watch?v=bMB8qDYa8N0>



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What do you know about Blaise Pascal?
What do these terms mean?

exponent coefficient variable binomial expansion

Listen to and watch the video, answer questions and fill in the missing items.

- a) What is the aim of the lecture?
- b) We need to recognize the relations between
- c) The first and the last terms are both raised to.....
- d) Whatever exponent I start with on the variable itfrom that exponent down to an exponent ofThe other exponentfrom zero up to x to the nth power.
- e) The first and last are 1.
- f) The so called binomial expansions keep you from
- g) You add two numbers above to get
- h) Pascal was a
- i) If you know Pascal's triangle, you can
- j) If you add up of Pascal's triangle, you get the Fibonacci sequence.
- k) What does the speaker like about maths?

Pascal's Triangle

Adapted from Nucleus, Maths, English for Science and Technology

1) Read the text and fill in the missing words. Try to guess.

A single dice is thrown. There are two possible outcomes – odd or The chances of throwing an odd number are 1 in 2, and so are the of throwing an even number. Supposing now that two are thrown. There are now three possible outcomes: both odd, both even, or one odd and one even. But the last result, one odd and one even, can occur in two different ways, either the dice odd and the second dice even, or the first dice even and the second dice odd. So the chances of throwing odd are 1 in 4 of throwing both even 1 in 4, and of throwing one odd and one even 2 in 4. Throwing three dice produces different possibilities: EEE, EEO, EOO, EOE, OEE,, OOE and OOO. Thus the probabilities are as follows: all evens, 1 in 8, all odds 1 in 8, two odds and one even, in 8, two evens and one, 3 in 8.

These results can be by using a device called Pascal's Triangle, the first three rows of which are shown in Fig. 10.1. This triangle can easily be formed. The first and last figure in each row is Every other figure is the of the two figures above it. Thus, in the second row, 2 is the sum of 1 and 1. In the third row, both threes are formed by 2 and 1. The total of all figures in each row gives the total number of possibilities for that row. Thus the third row has $1+...+3+1$ possibilities.

2) Write down the next three rows of Pascal's triangle

		1		1	
	1		2		1
1	3		3		1

Using the triangle, state the chances of the following events when throwing six dice.

- a) All odd
- b) Either all odd or all even
- c) An equal number of odd and even
- d) Five odd and one even or vice versa