

Name

1. Use the word MATHEMATICS to find

a) the total number of arrangements,

..... [2]

b) the total number of arrangements that begin with the letter M,

..... [2]

c) the total number of arrangements that begin and end with the letter M.

..... [2]

2. From a group of 6 girls and 6 boys a committee of 5 people is to be chosen.

a) Calculate the number of different ways in which this can be done.

..... [2]

b) If at least two girls must be on the committee, calculate the number of different ways in which the committee can now be chosen.

..... [4]

- c) One of the boys and one of the girls are twin brother and sister and are not allowed to sit on the committee together. Taking this into account, calculate the number of ways in which the committee can be chosen.

..... [3]

3. a) One of the lines of Pascal's triangle begins with,

1 6 15

Complete this line of Pascal's triangle.

..... [2]

- b) Hence, or otherwise, expand fully $(2 - x)^6$.

..... [4]

4. Find the value of the coefficient of the y^4 term in the expansion of,

$$(3 - y^2)^4$$

..... [4]

5. Find the term independent of x in the expansion,

$$\left(2x - \frac{1}{x^2}\right)^6$$

..... [4]

6. In an Olympic 100 metre race there are 8 tracks and 6 runners.

a) If lanes 1 to 6 only are used, calculate how many different ways are there in which the runners can line up.

..... [2]

b) If all 8 lanes can be used, calculate how many different ways are there in which the runners can line up.

..... [2]

c) Two of the runners are from the same country and it has been decided that they must run with one in lane 1 and one in lane 8. Calculate how many ways in which the runners can now line up.

..... [2]

Arrangements and Binomial expansions

HL Maths

Answers

1. a) 4989600 b) 907200 c) 90720
2. a) 792 b) 636 c) 708
3. a) 20,15,6,1
 b) $64 - 192x + 240x^2 - 160x^3 + 60x^4 - 12x^5 + x^6$
4. 54
5. 240
6. a) 720 b) 20160 c) 15