AQA – Sequence and series – A2 Mathematics P3

1. June/2020/Paper_3/No.7

(a) Using ${}^nC_r = \frac{n!}{r!(n-r)!}$ show that ${}^nC_2 = \frac{n(n-1)}{2}$

[2 marks]

(b) (i) Show that the equation

$$2 \times {}^nC_4 = 51 \times {}^nC_2$$

simplifies to

$$n^2 - 5n - 300 = 0$$

[3 marks]

(b) (ii) Hence, solve the equation

$$2 \times {}^{n}C_4 = 51 \times {}^{n}C_2$$

[2 marks]

2. June/2020/Paper_3/No.8

The sum to infinity of a geometric series is 96

The first term of the series is less than 30

The second term of the series is 18

(a) Find the first term and common ratio of the series.

[5 marks]

(b) (i) Show that the nth term of the series, u_n, can be written as

$$u_n = \frac{3^n}{2^{2n-5}}$$

[4 marks]

(b) (ii) Hence show that

$$\log_3 u_n = n(1 - 2\log_3 2) + 5\log_3 2$$

[3 marks]

3. June/2019/Paper_3/No.2

Find the value of $\frac{100!}{98! \times 3!}$

Circle your answer.

[1 mark]

$\frac{50}{147}$ 1650 3300 161 700

4. June/2019/Paper_3/No.3

Given $u_1 = 1$, determine which one of the formulae below defines an increasing sequence for $n \geq 1$

Circle your answer.

[1 mark]

$u_{n+1} = 1 + \frac{1}{u_n}$ $u_n = 2 - 0.9^{n-1}$ $u_{n+1} = -1 + 0.5u_n$ $u_n = 0.9^{n-1}$