

AQA – Sequence and series – A2 Mathematics P1**1. June/2020/Paper_1/No.1**

The first three terms, in ascending powers of x , of the binomial expansion of $(9 + 2x)^{\frac{1}{2}}$ are given by

$$(9 + 2x)^{\frac{1}{2}} \approx a + \frac{x}{3} - \frac{x^2}{54}$$

where a is a constant.

- (a) State the range of values of x for which this expansion is valid.

Circle your answer.

[1 mark]

$|x| < \frac{2}{9}$

$|x| < \frac{2}{3}$

$|x| < 1$

$|x| < \frac{9}{2}$

- (b) Find the value of a .

Circle your answer.

[1 mark]

1

2

3

9

2. June/2020/Paper_1/No.7

Consecutive terms of a sequence are related by

$$u_{n+1} = 3 - (u_n)^2$$

(a) In the case that $u_1 = 2$

(a) (i) Find u_3

[2 marks]

(a) (ii) Find u_{50}

[1 mark]

(b) State a different value for u_1 which gives the same value for u_{50} as found in part (a)(ii).

[1 mark]

3. June/2020/Paper_1/No.10

(a) An arithmetic series is given by

$$\sum_{r=5}^{20} (4r + 1)$$

(a) (i) Write down the first term of the series.

[1 mark]

(a) (ii) Write down the common difference of the series.

[1 mark]

(a) (iii) Find the number of terms of the series.

[1 mark]

(b) (ii) The 40th term of the series is 4 times the 2nd term.

Find the values of b and c .

[4 marks]

4. June/2019/Paper_1/No.5

An arithmetic sequence has first term a and common difference d .

The sum of the first 16 terms of the sequence is 260

(a) Show that $4a + 30d = 65$

[2 marks]

(b) Given that the sum of the first 60 terms is 315, find the sum of the first 41 terms.

[3 marks]

(c) S_n is the sum of the first n terms of the sequence.

Explain why the value you found in part (b) is the maximum value of S_n

[2 marks]

5. June/2019/Paper_1/No.8

$$P(n) = \sum_{k=0}^n k^3 - \sum_{k=0}^{n-1} k^3 \text{ where } n \text{ is a positive integer.}$$

(a) Find $P(3)$ and $P(10)$

[2 marks]

(b) Solve the equation $P(n) = 1.25 \times 10^8$

[2 marks]
