

QQQ – Core Pure 2 – Chapter 2 – More Series (Version 1)

Total Marks: 25

(25 = Platinum, 23 = Gold, 20 = Silver, 17 = Bronze)

1. Which of the following functions has the fourth term $-\frac{1}{720}x^6$ in its Maclaurin series expansion?

Circle your answer.

[1 mark]

- $\sin x$
- $\cos x$
- e^x
- $\ln(1 + x)$

(Total 1 marks)

AQA AS June 2018 Paper 1 Q3

2. In this question you must show detailed reasoning.

Find $\sum_{r=2}^{50} \left(\frac{1}{r-1} - \frac{1}{r+1} \right)$, expressing the answer as an exact fraction.

[3]

(Total 3 marks)

OCR MEI AS October 2020 Paper 1 Q1

3. Show that the Maclaurin series for $\ln(e + 2ex)$ is

$$1 + 2x - 2x^2 + ax^3 - \dots$$

where a is to be determined.

[3 marks]

(Total 3 marks)

AQA AS June 2021 Paper 1 Q7

4. Use the method of differences to show that

$$\sum_{r=1}^n \frac{2}{(r+4)(r+6)} = \frac{n(an+b)}{30(n+5)(n+6)}$$

where a and b are integers to be determined.

(6)

(Total 6 marks)

Edexcel A2 June 2024 Paper 2 Q4

5.

(a) (i) Given that $f(x) = \sqrt{1+2x}$, find $f'(x)$ and $f''(x)$. [2]

(ii) Hence, find the first three terms of the Maclaurin series for $\sqrt{1+2x}$. [2]

(b) Hence, using a suitable value for x , show that $\sqrt{5} \approx \frac{143}{64}$. [2]

(Total 6 marks)

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6.

(a) Write down the Maclaurin series of e^x , in ascending power of x , up to and including the term in x^3 (1)

(b) Hence, without differentiating, determine the Maclaurin series of

$$e^{(e^x-1)}$$

in ascending powers of x , up to and including the term in x^3 , giving each coefficient in simplest form. (5)

(Total 6 marks)

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