C2 review 1

1. Find the behaviour of the sequence defined by :

$$u_{n+1} = u_n^2 - 1 \qquad \text{when} \quad u_1 = \sqrt{2}$$

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2. Find the value of θ between 0 and 360° such that :

$$\tan 2\theta = -1$$

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3. An arithmetic series is such that the sum of its first 10 terms is 20 and the sum of its first 20 terms is 10. Find the sum of its first 40 terms.

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4. Find $\sum_{r=1}^{10} r + 2^r$

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5. Find the coefficient of x^4 in the expansion of $(2 - 3x)^{10}$:

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6. Express as a single logarithm

(a) $\log xy + 2 \log x - 3 \log y$

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6. Solve the following equation

(b) $2 + \log_2 x = 2 \log_2(x + 1)$

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Answers

1. Oscillates between 0 and -1
2. $67.5^\circ, 157.5^\circ, 247.5^\circ, 337.5^\circ$
3. $d = -0.3$, $a = 3.35$ $S_{40} = -100$
4. $\sum r + \sum 2^r$ = arithmetic + geometric
   = 55 + 2046
   = 2101
5. $1\ 088\ 640x^4$
6. (a) $\log \frac{x^3}{y^2}$
   (b) $x = 1$