| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 6(a) | $\dfrac{\left(\dfrac{4x}{2x^2+1}\times(x+2)\right)-\ln(2x^2+1)}{(x+2)^2}$ oe, isw | **3** | **B1** for $\dfrac{4x}{2x^2+1}$<br>**M1** for attempt at differentiation of a quotient or correct product<br>**A1** for all terms apart from $\dfrac{4x}{2x^2+1}$ correct |
| 6(b) | When $x=2$, $\dfrac{dy}{dx}=0.0849$ and attempt at correct use of small changes | **M1** | Substitution of $x=2$ needs to be seen if simplification of **(a)** is incorrect. |
| | Change = $0.0849h$ | **A1** | Must have full marks in part **(a)** |
| 6(c) | $\dfrac{dy}{dt}=-0.4$ soi | **B1** | |
| | $\dfrac{dx}{dt}=-\dfrac{0.4}{their\ \dfrac{dy}{dx}_{x=2}}$ | **M1** | |
| | awrt $-4.71$ | **A1** | |
| 7(a) | Least value of $a$ when $2+a=1$<br>so $a=-1$. | **2** | **B1** for range of f: $2+a$, may be implied by $a+1$ or $\sqrt{a+1}$ |
| 7(b) | $\sqrt{(2e^x+5)-1}$ $[=3]$ | **M1** | For correct order |
| | $x=0.916$ | **2** | **M1** for correct attempt to solve to obtain $x=\ldots$ |
| 8(a) | Numerator: $\dfrac{\sin\theta\times\sin^2\theta}{\cos^2\theta}$<br>or Denominator: $\dfrac{1}{\cos^2\theta}$ soi | **B1** | Allow for a correct step and equivalent methods |
| | $\dfrac{\dfrac{\sin\theta\times\sin^2\theta}{\cos^2\theta}}{\dfrac{1}{\cos^2\theta}}=\sin^3\theta$ | **B1** | Must have sufficient detail |