| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 6(b)(iv) | $1027 = \frac{78}{2}(79)\log_x 3$ or $3081\log_x 3$ | **M1** | For using *their* 78 in a sum equation or using 3081 to obtain $x$ |
| | $x = 27$ | **A1** | |
| 7(a) | $AE^2 = \left(\sqrt{17}-1\right)^2 + \left(\sqrt{17}+1\right)^2$<br>$= 18 + 2\sqrt{17} + 18 - 2\sqrt{17}$ | **M1** | For attempt to find $AE$.<br>Must see at least 3 terms in an expansion that is not the difference of two squares to be convinced a calculator is not being used. |
| | $AE = 6$ | **A1** | |
| | Perimeter $= 4\sqrt{17} + 8 + \textit{their } AE$<br>$= 4\sqrt{17} + 14$ | **B1** | **FT** on *their* $AE$ |
| 7(b) | Area $= \frac{1}{2}\left(3\sqrt{17}+7\right)\left(\sqrt{17}+1\right)$ oe<br>$= \frac{1}{2}\left(51 + 3\sqrt{17} + 7\sqrt{17} + 7\right)$ oe | **M1** | For attempt at a trapezium or triangle and rectangle.<br>Must see at least 3 terms in an expansion that is not the difference of two squares to be convinced a calculator is not being used.<br>Allow one arithmetic slip. |
| | Area $= 29 + 5\sqrt{17}$ | **A1** | |
| 7(c) | $\tan AED = \frac{\sqrt{17}+1}{\sqrt{17}-1} \times \frac{\sqrt{17}+1}{\sqrt{17}+1}$ | **M1** | For attempt at rationalisation. |
| | $\frac{9+\sqrt{17}}{8}$ | **A1** | Must come from $\frac{18+2\sqrt{17}}{16}$ to be convinced a calculator is not being used. |
| 7(d) | $\sec^2 AED = \tan^2 AED + 1$<br>$= \frac{\left(9+\sqrt{17}\right)^2}{64} + 1$<br>$\frac{81+17+18\sqrt{17}+64}{64}$ oe<br>if $\frac{\left(9+\sqrt{17}\right)^2}{64}$ and 1 are considered separately. | **M1** | For use of *their* **(c)** in the correct identity and attempt to simplify to obtain a single fraction.<br>Must see at least 3 terms in an expansion that is not the difference of two squares to be convinced a calculator is not being used.<br><br>Allow one arithmetic slip |
| | $\frac{81+9\sqrt{17}}{32}$ oe | **A1** | cao |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 8(a)(i) | $\sin x \dfrac{\sin x}{\cos x} + \cos x$ | **B1** | |
| | $\dfrac{\sin^2 x + \cos^2 x}{\cos x}$ oe | **B1** | |
| | $\dfrac{1}{\cos x} = \sec x$ | **B1** | Poor notation is B0 |
| 8(a)(ii) | $\sec\dfrac{\theta}{2} = 4$<br>$\cos\dfrac{\theta}{2} = \dfrac{1}{4}$ | **M1** | For use of (i) and dealing with sec to obtain $\cos\dfrac{\theta}{2} = \dfrac{1}{4}$ |
| | $\dfrac{\theta}{2} = 1.3181,\ 4.9651$<br>$\theta = 2.64$ or $0.839\pi$<br>$\theta = 9.93$ or $3.16\pi$ | **3** | **Dep M1** for a correct attempt to solve to obtain at least one solution for $\theta$<br>**A1** for one correct solution<br>**A1** for a second correct solution and no extra solutions |
| 8(b) | $\tan\left(y + 38^\circ\right) = \dfrac{1}{\sqrt{3}}$<br>$y = 172^\circ$<br>$y = 352^\circ$ | **3** | **M1** for dealing with cot and a correct attempt to obtain at least one correct solution, allow for $-8^\circ$<br>**A1** for one correct solution<br>**A1** for a second correct solution and no extra solutions |
| 9(a) | $(2x-1)\left(x^2 - x - 1\right)$ | **M1** | For attempt at factorisation by observation or by algebraic long division |
| | $(2x-1)\left(x^2 - x - 1\right)$ | **A1** | cao |
| 9(b) | At $A$ $x = \dfrac{1}{2}$ | **B1** | |
| | $x^2 - x - 1 = 0$ | **M1** | For a valid attempt to solve *their* quadratic equation, allow for decimal solutions |
| | $x = \dfrac{1 \pm \sqrt{5}}{2}$ soi | **A1** | |
| | At $B$ $x = \dfrac{1 + \sqrt{5}}{2}$ | **A1** | |