| Question | Scheme | Marks | AOs |
|---|---|---|---|
| 7(a) | $\sqrt{(4-x)}=2\left(1-\frac{1}{4}x\right)^{\frac{1}{2}}$ | M1 | 2.1 |
| | $\left(1-\frac{1}{4}x\right)^{\frac{1}{2}}=1+\frac{1}{2}\left(-\frac{1}{4}x\right)+\frac{\left(\frac{1}{2}\right)\left(-\frac{1}{2}\right)}{2!}\left(-\frac{1}{4}x\right)^2+\ldots$ | M1 | 1.1b |
| | $\sqrt{(4-x)}=2\left(1-\frac{1}{8}x-\frac{1}{128}x^2+..\right)$ | A1 | 1.1b |
| | $\sqrt{(4-x)}=2-\frac{1}{4}x-\frac{1}{64}x^2+\ldots$ and $k=-\frac{1}{64}$ | A1 | 1.1b |
| | | **(4)** | |
| **(b)** | The expansion is valid for $\lvert x\rvert<4$, so $x=1$ can be used | B1 | 2.4 |
| | | **(1)** | |
| | | **(5 marks)** | |

**Notes:**

**(a)**

**M1:** Takes out a factor of 4 and writes $\sqrt{(4-x)}=2(1\pm\ldots)^{\frac{1}{2}}$

**M1:** For an attempt at the binomial expansion with $n=\frac{1}{2}$

Eg. $(1+ax)^{\frac{1}{2}}=1+\frac{1}{2}(ax)+\frac{\left(\frac{1}{2}\right)\left(-\frac{1}{2}\right)}{2!}(ax)^2+\ldots$

**A1:** Correct expression inside the bracket $1-\frac{1}{8}x-\frac{1}{128}x^2+$ which may be left unsimplified

**A1:** $\sqrt{(4-x)}=2-\frac{1}{4}x-\frac{1}{64}x^2+\ldots$ and $k=-\frac{1}{64}$

**(b)**

**B1:** The expansion is valid for $\lvert x\rvert<4$, so $x=1$ can be used