| Question | Answer | Marks | Partial Marks |
|---|---|---|---|
| 9 | $A(2, 0)$ or $x = 2$ [$x = 6$] | **2** | **M1** for factorising or solving $32x - 4x^2 - 48 = 0$ |
| | Finds equation $CD$/ $x$-coordinate of $C$ or $D$ or maximum point : $x = 4$ | **2** | **M1** for $\frac{2+6}{2}$ or $32 - 8x = 0$ |
| | $D(4, 8)$ or [equation $AB$ is $y =$] $4x - 8$ | **2** | **M1** for $y = \frac{2}{3}\times 12$ or $m_{AB} = \frac{12-0}{5-2}$ soi |
| | $\left[\frac{32}{2}x^2 - \frac{4}{3}x^3 - 48x\right]_2^4$ or $\left[\frac{28}{2}x^2 - \frac{4}{3}x^3 - 40x\right]_2^4$ | **B1** | **must be seen** |
| | Correct plan **including** correct substitution of upper and lower limits at some point e.g. $\left[16x^2 - \frac{4}{3}x^3 - 48x\right]_2^{their4} - \frac{1}{2}\times(their4 - 2)\times their8$ or $\left[16x^2 - \frac{4}{3}x^3 - 48x\right]_2^{their4} - [2x^2 - 8x]_2^{their4}$ or $\left[14x^2 - \frac{4}{3}x^3 - 40x\right]_2^{their4}$ | **M1** | **dep** on attempt to integrate<br>**FT** *their* 4 and *their* 8 if needed<br><br>or<br>**FT** *their* 4 and *their* $4x - 8$ of the form $mx + c$ if needed<br>or<br>**FT** *their* 4 and $(32 - their4)x - 4x^2 + (-48 - their(-8))$ providing clear evidence of the derivation of this has been seen |
| | $\frac{40}{3}$ isw or 13.3[33….] **nfww** | **A1** | **dep on all previous marks awarded** |
| 10(a) | Valid explanation using f: f is one-one oe | **B1** | |
| 10(b) | Complete method to find inverse function: Swaps the variables and rearranges or rearranges and swaps the variables | **M1** | Condone one sign or arithmetic error but must have the correct order of operations |
| | $\left[f^{-1}(x) =\right] -\sqrt{\ln x - 3}$ isw or $\left[f^{-1}(x) =\right] -\sqrt{\ln\frac{x}{e^3}}$ oe isw | **A2** | **A1** for $\left[f^{-1}(x) =\right]$ $[\pm]\sqrt{\ln x - 3}$ or $\left[f^{-1}(x) =\right]$ $[\pm]\sqrt{\ln\frac{x}{e^3}}$ oe |
| | Domain $f^{-1}$: $x > e^3$ | **B1** | |
| | Range $f^{-1}$: $f^{-1} < 0$ | **B1** | |

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