# Mean value of a function

Answers

**Further Maths topic practice**

This topic online

| Q | Answer | Marks |
|---|---|---|
| 1 | 17 | 3 |
| 2 | mean value = ln 3 | 3 |
| 3 | $1/2 - 3\sqrt{3}/(8\pi)$ | 4 |
| 4 | **a)** $(e^2 + 1)/2$ **b)** $(3e^2 - 5)/2$ | 5 |
| 5 | **a)** $(x - 2)^2 + 9$ **b)** $(1/3)\arctan((x - 2)/3) + c$ **c)** $\pi/36$ | 6 |
| 6 | $\pi/12$ | 5 |
| 7 | **a)** 23 **b)** 7 **c)** 7 **d)** 5.5 | 6 |
| 8 | **a)** $(x + 3)^2 + 4$ **b)** $(2/3)\ln 2$ | 6 |
| 9 | **a)** $x \arctan x - (1/2)\ln(1 + x^2) + c$ **b)** shown<br>**c)** $\pi/3 - (\sqrt{3}/3)\ln 2$, because the graph and the interval are both stretched by scale factor 2 parallel to the x-axis | 8 |
| 10 | **a)** 54.5 $m^3 s^{-1}$ **b)** $4.71 \times 10^7$ $m^3$<br>**c)** The model overestimates, so reduce the constant 90 (or 20) so that the mean is 47 | 8 |
| 11 | **a)** shown **b)** 17.2 °C **c)** 62.9 °F<br>**d)** The model is the same every day; the actual temperature depends on the weather (sunshine, cloud, season) | 9 |
| 12 | **a)** shown **b)** 0.045 **c)** $\pi/4$<br>**d)** The integral tends to $\pi/4$ but the length $k + 1 \to \infty$, so the mean value tends to 0 | 10 |

Full worked solutions, written out by hand, are on the solutions sheet for this topic.


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