Exercise 2G

1 a Code using the formula $y = \dfrac{x}{10}$ to give coded data: 11, 9, 5, 8, 3, 7, 6

b $11 + 9 + 5 + 8 + 3 + 7 + 6 = 49$

Mean $= \dfrac{49}{7} = 7$

c $7 = \dfrac{\bar{x}}{10}$ so $\bar{x} = 70$

2 a Code using the formula $y = \dfrac{x-3}{7}$ to give coded data: 7, 10, 4, 10, 5, 11, 2, 3

b $7 + 10 + 4 + 10 + 5 + 11 + 2 + 3 = 52$

Mean $= \dfrac{52}{8} = 6.5$

c $6.5 = \dfrac{\bar{x}-3}{7}$ so $\bar{x} = 48.5$

3 $(1.5 \times 200) + 65 = 365$

4 Standard deviation $= 42.34$

5 a

Battery life (b hours)	Frequency (f)	Midpoint (x)	$y = \dfrac{x-14}{2}$
11–21	11	16	1
21–27	24	24	5
27–31	27	29	7.5
31–37	26	34	10
37–43	12	40	13

b Mean $= \dfrac{(1 \times 11) + (5 \times 24) + (7.5 \times 27) + (10 \times 26) + (13 \times 12)}{100}$

$= 7.50$

6 a Mean $= \dfrac{(1\times 3)+(1.1\times 12)+(1.2\times 40)+(1.3\times 10)+(1.4\times 5)}{70}$

$= \dfrac{84.2}{70}$

$= 1.2$ hours

b $\dfrac{84.2}{70} = \dfrac{\overline{x}-1}{20}$ so $\overline{x} = 25.1$ hours

c Standard deviation of coded data $= \sqrt{\dfrac{101.82}{70} - \left(\dfrac{84.2}{70}\right)^2}$

$= 0.0877845\ldots$

Standard deviation $= 20 \times 0.0877845\ldots = 1.76$ hours

7 Standard deviation of coded data $= \sqrt{\dfrac{176.84}{100} - \left(\dfrac{131}{100}\right)^2} = 0.229$

Standard deviation $= 0.229 \times 100 = 22.9$

8 Standard deviation of coded data $= \sqrt{\dfrac{147.03}{6} - \left(\dfrac{16.1}{6}\right)^2} = 4.16$

Standard deviation $= \dfrac{4.16}{0.01} = 416$

9 Coded mean $= 10.15$
Mean of the daily mean pressure $= 2(10.15 + 500) = 1020.3$ hPa

Coded standard deviation $= \sqrt{\dfrac{S_{cc}}{n}} = \sqrt{\dfrac{296.4}{30}} = 3.1432\ldots$

Standard deviation of the daily mean pressure $= 2 \times 3.1432\ldots = 6.28$ hPa