Question Number	Scheme	Marks
4. (a)	Width = **0.5** (cm)	B1
	1cm^2 rep's 4 babies or 0.25cm^2 rep's 1 baby or their $h \times w = 3.5$ or area = 3.5 cm^2	M1
	Height = $\frac{14}{16} \times 4 \div 0.5 =$ **7** (cm)	A1
		(3)
(b)	Lower Quartile = $[2.5] + \frac{\frac{98}{4} - 16}{24} \times 0.5$ $= [2.5] + \frac{8.5}{24} \times 0.5$	M1
	$= 2.50 + 0.177\ldots$ = awrt **2.68**	A1
		(2)
(c)	$Q_2 - Q_1 = 3.14 - "2.68" = \underline{\underline{0.46 > 0.41}} = 3.55 - 3.14 = Q_3 - Q_2$	M1
	So negative skew	A1
		(2)
(d)	$\overline{w} = \frac{311.5}{98} = 3.17857\ldots$ = awrt **3.18**	B1
	$\sigma_w = \sqrt{\frac{1051.125}{98} - \overline{w}^2} = \sqrt{0.622448...}$; = 0.78895… = awrt **0.789**	M1
		A1
		(3)
(e)	$\frac{3("3.18" - 3.14)}{"0.789"} = 0.152\ldots$ awrt **0.15**	M1A1
		(2)
(f)(i)	49th value now 3.25 [or median in group $3.25 \leqslant w < 3.50$] so median increases	B1
(ii)	more higher values or Σfx increases … so mean increases	B1
		(2)
		[14]

	Notes
(a)	B1 0.5 only M1 may be implied by correct height A1 correct height of 7(cm)
(b)	M1 for any correct equation leading to correct fraction as part of m = …or (m – [2.5]) = … Ignore incorrect end point and watch out for "working down" Using 25 for 24.5 is M0 A1 awrt 2.68 allow exact fraction e.g. $\frac{257}{96}$ (allow 8.75 for 8.5 [or $\frac{515}{192}$] if n +1 used)
(c)	M1 for use of $Q_2 - Q_1$ and $Q_3 - Q_2$ (o.e.) ft their Q_1 [or correct inequality and –ve skew] or a correct quartile inequality **and** statement that negative skew A1 for correctly concluding negative skew from their values. Their ft calc should be correct.
(d)	B1 for awrt 3.18 (allow $\frac{89}{28}$) M1 for a correct expression (including square root) ft their mean ($\frac{\sqrt{122}}{14}$ scores M1) A1 for awrt 0.789 (accept s = 0.79301… = awrt 0.793)
(e)	M1 for correct substitution (ft their values and condone missing 3) A1 for awrt 0.15
(f)(i)	1st B1 for median increases with a suitable reason to support this (must mention the 3.25)
(ii)	2nd B1 for mean increases with a suitable reason to support this (Recalc of $\overline{x} = 3.196...$ is B0)