Question	Scheme	Marks
5 (a)	$\mathrm{P}(L < 3.86) = \mathrm{P}\left(Z < \pm\dfrac{3.86-4.5}{0.4}\right)$	M1
	$= \mathrm{P}(Z < -1.6) = 1 - 0.9452$ or $1 - 0.945200\ldots = 0.0548$ awrt 0.0548	M1 A1 (3)
(b)(i)	$\mathrm{P}(L < Q_3) = 0.75$ gives $\dfrac{Q_3 - 4.5}{0.4} = 0.67$ or $\mathrm{P}(L < Q_1) = 0.25$ gives $\dfrac{Q_1 - 4.5}{0.4} = -0.67$	M1 B1
	$[Q_3 =]4.768$ awrt 4.77 or $Q_1 = 4.232$ awrt 4.23	A1
(ii)	$[Q_1 =]'4.232'$ awrt 4.23 or $[Q_3 =]'4.768'$ awrt 4.77	B1 ft (4)
(c)	$1.5('Q_3' - 'Q_1')[= 0.804]$ (0.81)	M1
	Lower limit = 3.428 (3.42 – 3.43) Upper limit = 5.572 (5.57 – 5.58)	A1 A1 (3)
(d)	$\mathrm{P}('3.42' < L < '5.58') = \mathrm{P}\left(\dfrac{'3.42' - 4.5}{0.4} < Z < \dfrac{'5.58' - 4.5}{0.4}\right)$	M1 A1ft
	$= \left[\mathrm{P}(-2.7 < Z < 2.7)\right] = 0.9930*$ (Calculator gives 0.99306…)	A1* (3)
(e)	$\mathrm{P}(5 < L < '5.58') = \mathrm{P}\left(\dfrac{5 - 4.5}{0.4} < Z < \dfrac{'5.58' - 4.5}{0.4}\right) = 0.1021$ (Calculator gives 0.10218…) awrt 0.102	M1 A1
	$\mathrm{P}(L > 5 \mid '3.42' < L < '5.58') = \dfrac{\mathrm{P}(5 < L < '5.58')}{\mathrm{P}('3.42' < L < '5.58')}\left[= \dfrac{'0.102'}{0.993}\right]$	M1
	$= 0.1027$ awrt 0.103	A1 (4)
	Notes	**Total 17**

(a)	**M1**	for standardising with 3.86, 4.5 and 0.4
	M1	for $1 - p$ where $0.5 < p < 1$
	A1	for awrt 0.0548 (**NB** awrt 0.0548 scores 3/3)
(b)(i)	**M1**	for standardising with Q_3 or Q_1 (o.e.), 4.5 and 0.4 and setting equal to a z value, $0.65 < \lvert z \rvert < 0.7$
	B1	for use of 0.67,, $\lvert z \rvert$,, 0.675 This may be implied by a final answer of 4.769… or 4.2302…
	A1	awrt 4.77 or awrt 4.23 for Q_1 correctly labelled **NB** it is possible to score M1B0A1
(b)(ii)	**B1ft**	awrt 4.23 if Q_3 given in (i) or awrt 4.77 if Q_1 given in (i) ft their part (b)(i) You will need to check whether $Q_1 + Q_3 = 9$
(c)	**M1**	use of $1.5(Q_3 - Q_1)$ ft their Q_3 and Q_1 If these are not correct then working must be shown
	A1	for lower limit awrt 3.42 to 3.43
	A1	for upper limit awrt 5.57 to 5.58
(d)	**M1**	for a correct standardisation for either their 3.42 **or** their 5.58 May be implied by awrt –2.7 or awrt 2.7 If lower/upper limits are incorrect then the standardisation must be shown
	A1ft	for a correct standardisation for their 3.42 **and** their 5.58 May be implied by awrt –2.7 **and** awrt 2.7 If lower/upper limits are incorrect then the standardisation must be shown or clear use of symmetry e.g. $(0.9965 - 0.5) \times 2$ Do not allow use of negative limits
	A1*	answer is given so there must be a fully correct solution given with no errors Allow 0.9930… or better or 0.9965 – 0.0035 oe or 1 – 0.0035 – 0.0035 oe
(e)	**M1**	for writing or using $\mathrm{P}(5 < L < '5.58')$ Maybe implied by awrt 0.102
	A1	awrt 0.102
	M1	for a correct probability statement in either form or a correct ratio ft their lower and upper limits Allow $\dfrac{\mathrm{P}(5 < L < '5.58')}{0.993}$
	A1	awrt 0.103