Question Number	Scheme	Marks
6. (a)	$[\mathrm{P}(A < 388) = 0.001 \Rightarrow] \quad \dfrac{388-\mu}{\sigma} = \pm z$ (where $\lvert z\rvert > 2.25$) So $388 - \mu = -3.0902\sigma$ (o.e.)	M1
	$[\mathrm{P}(A > 410) = 0.0197 \Rightarrow] \quad \dfrac{410-\mu}{\sigma} = \pm z$ (where $1 < \lvert z\rvert < 2.5$) So $410 - \mu = 2.06\sigma$ (o.e.)	M1
	So $22 = 5.1502\sigma$ (calc gives 5.1502323…) $\Rightarrow \mu = ..., \ \sigma = ...$	dM1
	σ = 4.2716… (awrt **<u>4.27</u>**) and $\mu = 401.20…$ (awrt **<u>401</u>**)	A1, A1 (5)
(b)	[Let X = profit in £] x $\quad -100$ $\quad -0.30$ $\quad 0.25$ $\mathrm{P}(X = x)$ $\quad 0.001$ $\quad 0.0197$ $\quad 1 - (0.001 + 0.0197) = 0.9793$	M1 M1
	$\mathrm{E}(X) = -100\times0.001 - 0.30\times0.0197 + 0.25\times\text{"}0.9793\text{"}$ $= 0.138915…$ awrt (**<u>£) 0.14</u>**	M1 A1 (4)

	Notes	Total: 9
(a)	M1 for an attempt to standardise with 388 and set equal to $\pm$ a z value where $\lvert z\rvert > 2.25$ M1 for an attempt to standardise with 410 and set equal to $\pm$ a z value where $1 < \lvert z\rvert < 2.5$ **Note standardisation is required so M1M1 is required to score dM1A1A1** dM1 dependent on both of the previous Ms. For solving their 2 linear equations and proceeding to values for σ and μ You do not need to check the mechanics of solving which may be via a calculator. May be implied by correct values for σ and μ A1 for σ = awrt 4.27 (must come from accurate z-values – 3sf or better seen somewhere in their solution) A1 for μ = awrt 401 Note (M1M1M1A0A1 is possible) **Note that if they form two the equations** $388 - \mu = 3.0902\sigma$ **and** $410 - \mu = -2.06\sigma$ **this leads to** σ = awrt -4.27 μ **= awrt 401 which is A0A0**	
(b)	M1 for 3 **correct** values of x including signs which may be embedded in a calculation M1 for an attempt to find P(388<A<410) (correct numerical expression for 0.9793) or implied by 0.9793 Look out for valid attempts at using their part (a) and standardising to find P(388<A<410) which can still score this mark. M1 dep on any 3 values of X and 3 probs. For an expression for E(X) using their value for P(388<A<410) condone sign slips for this mark A1 for awrt 0.14 (so don't insist on 2dp). Condone awrt 14p Accept 0.13 if correct answer is seen beforehand	