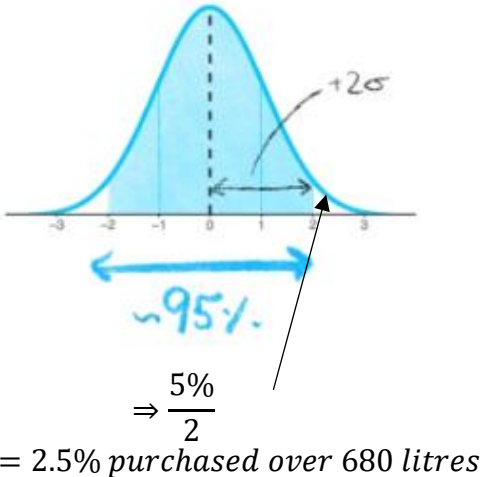
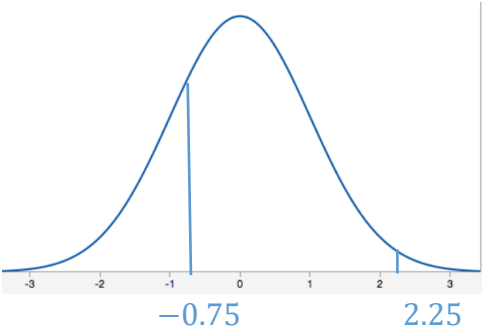


Q3	Model Solution – 25 Marks	Marking Notes
(a)	<p>a) <math>520 + 2(80) = 680</math>  <math>\bar{x} + 2\sigma = 680</math>  <math>\bar{x} \pm 2\sigma = 95\%</math> (Empirical Rule)</p>  <p><math>\Rightarrow \frac{5\%}{2}</math>  <math>= 2.5\%</math> purchased over 680 litres</p>	<p>MS (0, 4, 7, 10)</p> <p>LPC: Any relevant work. For example draws the normal distribution and labels the correct intervals. Or writes out the values of the empirical rule, 68%, 95% and 99.7%</p> <p>HPC: For correctly identifying 95%</p>
(b)	<p>a) <math>P(460 \leq X \leq 700)</math></p> $z = \frac{x - \mu}{\sigma}$ <p><math>x = 460</math>                      <math>x = 700</math>  <math>z = \frac{460 - 520}{80}</math>                      <math>z = \frac{700 - 520}{80}</math>  <math>= \frac{-60}{80}</math>                                      <math>= \frac{180}{80}</math>  <math>= -0.75</math>                                      <math>= 2.25</math></p>  <p><math>1 - (0.7734)</math>                                      <math>0.9878</math>  <math>= 0.2266</math></p> <p><math>\Rightarrow P(460 \leq X \leq 700) = 0.9878 - 0.2266 = 0.7612</math></p>	<p>MS (0, 4, 7, 10)</p> <p>LPC: any relevant step.</p> <p>HPC: finding <math>P(z</math> is greater than or equal to <math>-0.75)</math> or <math>P(z</math> is less than or equal to <math>2.25)</math> or both but then fails to finish.</p>

(c)	<p>a) <math>P(z \leq z_1) = 0.9</math>  <math>\Rightarrow z_1 \approx 1.28</math>  <math>\Rightarrow z_2 \approx -1.28</math></p> $z = \frac{x - \mu}{\sigma}$ $-1.28 = \frac{x - 520}{80}$ $-1.28(80) = x - 520$ $-102.4 = x - 520$ $-102.4 + 520 = x$ $417.6 = x = \textit{number of litres}$ $\Rightarrow 417.6 \times \text{€}0.89$ $= \text{€}371.664$ $\approx \text{€}371.66$	<p>MS (0, 3, 4, 5)</p> <p>LPC: finding z score of 1.28 and stops.</p> <p>HPC: finding 417.6 but fails to multiply by €0.89c</p> <p>**4 marks for incorrect rounding**</p>
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