1a) · The probability is close to 0.5
· A large number of trials.

b) $\mu = np = 30(0.4)$
$= \underline{\underline{12}}$

$\sigma^2 = np(1-p)$
$= 30(0.4)(0.6)$
$= 7.2$
$\sigma = \underline{\underline{\sqrt{7.2}}}$

8: upper bound 8.5
lower bound 7.5

$P(X < 7.5) = \underline{\underline{0.0468}}$ (3sf) A.

c) $P(X < 8) = \underline{\underline{0.0435}}$ (3sf)

d) $\frac{\text{"}0.0468\text{"} - \text{"}0.0435\text{"}}{\text{"}0.0435\text{"}} \times 100$

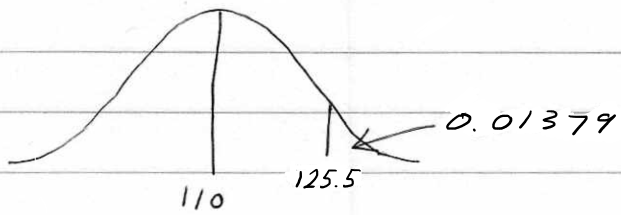
$= \underline{\underline{7.45\%}}$ 3sf

2a/ They would have no light bulbs left to sell.

b/ $H_0 : p = 55\%$
$H_1 : p > 55\%$

c/ $\mu = np$
$= 200(0.55)$
$= 110$

$\sigma^2 = np(1-p)$
$= 200(0.55)(0.45)$
$= 49.5$
$\sigma = \sqrt{49.5}$



126 LB = 125.5
UB = 126.5

$0.01379 < 0.05$ $\therefore$ we can reject H_0 and accept H_1. The manufacturer's claim is justified.

3a/ $\mu = np$
$= 50(0.6)$
$= 30$

$\sigma^2 = np(1-p)$
$= 50(0.6)(0.4)$
$= 12$
$\sigma = \sqrt{12}$

26 : upper bound 26.5
lower bound 25.5

$P(25.5 < X < 26.5) = 0.0592$ (3sf)

b/ There is not enough evidence to say that Andy's claim is incorrect.
There is a 5.92% chance of him getting 26 serves in if his claim is correct.

4/

$\mu = np$
$= n(0.38)$
$= 0.38n$

$\sigma^2 = np(1-p)$
$= n(0.38)(0.62)$
$= 0.2356n$
$\sigma = \sqrt{0.2356n}$

$P(X > 65.5) = 0.0438$

$1 - 0.0438 = 0.9562$

[Inverse Normal] $\mu = 0$ $\sigma = 1$

$z = 1.708\ldots$

$$1.708 = \frac{65.5 - 0.38n}{\sqrt{0.2356n}}$$

$$1.708\left(\sqrt{0.2356n}\right) = 65.5 - 0.38n$$

$$0.38n + 0.829n^{\frac{1}{2}} - 65.5 = 0$$

$$n^{\frac{1}{2}} = \frac{-0.829 \pm \sqrt{(0.829)^2 - 4(0.38)(-65.5)}}{2(0.38)}$$

$n^{\frac{1}{2}} = 12.08\ldots$ or $n^{\frac{1}{2}} = -14.\ldots$

$\underline{\underline{n = 146}}$

~~n = 203~~

$\sqrt{n} \neq$ negative number.