d) i) $P(X) = \frac{n!}{x!(n-x)!} p^x (1-p)^{n-x}$

$P_s(0) = \frac{20!}{0!(20-0)!} 0.08^0 (1-0.08)^{20-0} = 0.92^{20} = 0.1887$

$P_h(0) = \frac{20!}{0!(20-0)!} 0.01^0 (1-0.01)^{20-0} = 0.99^{20} = 0.8179$

$\frac{2}{2}$

ii) To complete the table

$P_s(1) = \frac{20!}{1!19!} \times 0.08 \times 0.92^{19} = 0.3282$

$P_s(2) = \frac{20!}{2!18!} \times 0.08^2 \times 0.92^{18} = 0.2711$

$P_s(3) = \frac{20!}{3!17!} \times 0.08^3 \times 0.92^{17} = 0.1414$

$P_s(4) = \frac{20!}{4!16!} \times 0.08^4 \times 0.92^{16} = 0.0523$

$P_s(X > 4) = 1 - (p(0) + p(1) + p(2) + p(3) + p(4))$
$= 1 - (0.3282 + 0.2711 + 0.1414 + 0.0523)$
$= 1 - 0.793 = 0.207$

And for the high quality boxes

$P_h(1) = \frac{20!}{1!19!} \times 0.01 \times 0.99^{19} = 0.1652$

$P_h(2) = \frac{20!}{2!18!} \times 0.01^2 \times 0.99^{18} = 0.0159$

$P_h(3) = \frac{20!}{3!17!} \times 0.01^3 \times 0.99^{17} = 0.001$

$P_h(4) = \frac{20!}{4!16!} \times 0.01^4 \times 0.99^{16} = 0$ (to four significant digits).

$P_h(X > 4) = 1 - (p(0) + p(1) + p(2) + p(3) + p(4))$
$= 1 - (0.1652 + 0.0159 + 0.001 + 0) = 0.8179$.

Now we can complete the table (on next page)