

$$W = \text{profit made} = \begin{cases} x - 100 \\ 0 \end{cases} \quad Y = U_{\text{uniform}}(70, 140)$$

$$F_y(y) = \begin{cases} 0, & y < 70 \\ \frac{y-70}{10}, & 70 \leq y < 100 \\ 1, & y \geq 100 \end{cases} \quad x \in (100, 140]$$

because when  $x \leq 100$  the profit will be negative or zero

$w$  is 0 when,  $y < x$

$w$  is  $x - 100$  when  $y > x$

$$P(y > x) = 1 - P(y < x)$$

$$= 1 - F_y(x) = 1 - \frac{x-70}{10}$$

$$W = x - 100$$

$$E[w] = P(y > x)(x - 100)$$

$$= \left(1 - \frac{x-70}{10}\right)(x - 100)$$

$$x - 100 - (x - 70)(x - 100) = x - 100 - \frac{x}{10} + \frac{170x}{10} - 7000$$

$\therefore$  Should bid \$120,000

$$\frac{2x}{10} = 1 + \frac{170}{10}$$

$$2x = 10 + 170 = 180$$

$$x = 90$$