The Charity Frozen Custard Case

You're ordering frozen custards to sell at an outdoor charity fundraiser barbecue. Assume demand is normally distributed with a mean of 500 and a standard deviation of 200. Since the weather is hot and you have no place to store any leftovers, assume that any you don't sellwill just be discarded. The custards cost $1 cup, and you'll sell them for $2.25 each.

A) Use the single period inventory model to determine how many custards to order to maximize expected profit.

$$SL = \frac{C_S}{C_S + C_e}$$

$$Q = d + Z_{SL} * \sigma_d$$

B) Suppose leftover icecream could be sold later for $1.20 with a storage cost of $0.40 each (net salvage value $0.80 per cup). In that case, how many should you order ?

C) Suppose there is no salvage and you order 900. What's the probability of losing money ?

D) What nonmonetary costs/risks should you consider ?

$$SL = \frac{C_S}{C_S + C_e}$$

$$SL = \frac{(2.25-1)}{(2.25-1)+1} = 0.56 \Rightarrow Z = 0.15$$

$$SL = \frac{(2.25-1)}{(2.25-1)+(1-0.8)} = 0.86 \Rightarrow Z = 1.08$$

$$Q = d + Z_{SL} * \sigma_d$$

$$Q = 500 + 0.15 * 200 = 530$$

$$Q = 500 + 1.08 * 200 = 716$$

spend 900*$1=$900 so must sell $900 to breakeven
$900/$2.25 each = 400 custards to break even
(400-500)/200=Z= -0.5 => P= 0.3085, or about 31%

Some non-monetary risks that were mentioned:

- bad PR when the icecream melts and people perceive wasted food
- Food spoils in the hot sun and people get sick--not uncommon at uncontrolled events run by amateurs
- What your boss might do to you when you run out and cut off his fun-CLM