**1. Walmart Inventory**

As a manager at Wal-Mart, you have just realized that the store frequently runs out of Nutella spread

jars. You are suspecting that there might be a problem with the replenishment policy.

Thus, you have decided to gather more data.

The demand for Nutella turns out to be normally distributed. The mean demand for one week is

200 jars and the standard deviation for the weekly demand is 30 jars. Wal-Mart’s purchasing cost

for Nutella is $4 per jar. The cost of holding one Nutella jar in the inventory is $1 per week. In

addition, the store incurs a cost of $25 for placing an order and it takes 2 weeks to receive the

order.

Wal-Mart is using continuous time (Q,ROP) policy to replenish its Nutella jar inventory. Based

on this, please answer the following questions. Please assume that 1 year = 52 weeks. (Please

note that z-table is provided on page 2.)

1. How many Nutella jars should Wal-Mart order at a time?
2. What should be the reorder point if Wal-Mart wants to provide a 95% service level?

c. How much additional safety stock is needed if the service level is increased from 95% to

99%?

Table of z-values

Probability z-value Probability z-value

0.99 2.326 0.89 1.227

0.98 2.054 0.88 1.175

0.97 1.881 0.87 1.126

0.96 1.751 0.86 1.080

0.95 1.645 0.85 1.036

0.94 1.555 0.84 0.994

0.93 1.476 0.83 0.954

0.92 1.405 0.82 0.915

0.91 1.341 0.81 0.878

0.90 1.282 0.80 0.842

2. **Gullo Sunglasses**

Geoff Gullo owns a small firm that manufactures “Gullo Sunglasses.” He has the opportunity to

sell a particular seasonal model to Land’s End. Geoff offers Land’s End two purchasing options:

• Option 1: Geoff offers to set his price at $65 and agrees to credit Land’s End $40 for each

unit Land’s End returns to Geoff at the end of the season (because those units did not

sell). Since styles change each year, there is essentially no value in the returned

merchandise.

• Option 2: Geoff offers a price of $55 for each unit, but returns are no longer accepted. In

this case, Land’s End throws out unsold units at the end of the season.

The season’s demand for this model will be normally distributed with mean of 200 and standard

deviation of 125. Land’s End will sell those sunglasses for $100 each. Geoff’s production cost

is $25

1. How many pairs of sunglasses would Land’s End buy under option 1? Option 2?

(b) To help Land’s End choose which option to take, you have run a Crystal Ball

simulation (see Table 1 on next page). For a given quantity of sunglasses purchased, you

simulated demand 1,000 times to estimate how many sunglasses would be sold and how many

sunglasses would be left over. Based on this information, which option will Land’s End choose?

Table 1: Summary Output of Crystal Ball Simulation

**Sunglasses**

**Bought Sold Leftover**

160 131 29

165 134 31

170 137 33

175 140 35

180 142 38

185 145 40

190 148 42

195 151 44

200 153 47

205 156 49

210 158 52

215 160 55

220 162 58

225 165 60

230 167 63

235 169 66

240 171 69

245 172 73

250 174 76

255 176 79

260 177 83

265 179 86

270 180 90

275 182 93

280 183 97

285 184 101

290 186 104

295 187 108

300 188 112

3**. Process Capability Index**

Krombach Auto Corporation, a German manufacturer of cars, investigates their steering wheel

attachment process. A steering wheel needs some “Spiel”, a small range where moving the

steering wheel does not turn the tires. This increase driving safety, as not every small movement

by the often-nervous driver is picked up by the car. However, if the Spiel is too large, drivers will

feel uncomfortable and have the impression that the car does not react to their action. Krombach

estimates that a Spiel of less than 1 degree is too little and causes too much nervousness. They

also estimate that a Spiel of more than 3 degrees is too much and causes concern with the

drivers. The steering wheel attachment process results in a Spiel with a mean of 1.7 degrees and

a standard deviation of 0.4 degrees. Is the process capable according to the traditional Cpk

definition of process capability?