

Instructions for the Week Beginning 8th October 2007

1 Reading

Read through sections 2.1 and 2.2

2 Exercises

From 2.1: 3, 7, (8), 11, 15

From 2.2: 1, 3, (5), 7, 11

A twenty minute quiz will be given on 12th October, and will be based on the questions not in parentheses.

3 Problems

A full write up of your working on the following problem is due by 5:00pm on 17th October. This single problem counts as two.

3.1 Making a Profit on Shoddy Goods

A coats manufacturer knows that there is a probability of $\frac{1}{3}$ of their coats having defect that will prevent a retailer from selling the coat. The cost of manufacturing the coats is \$60 per coat. To persuade retailers to buy from them, they make the following offer:

- A sample of five coats is to be taken, at random, from each consignment of 30 coats.
- If there are no defective coats in the sample then the retailer will buy the whole consignment at full cost of \$100 per coat.
- A reduction of \$20 per coat is made in the price for every defective coat found in the sample. So, for example, if 3 defects were found then the retailer would buy all 30 coats for \$40 each, (\$1200 in total); if all five are defective then the retailer would get all 30 coats for free.

Once a retailer has bought the consignment they will go through them and throw out the defective coats, and put the good coats on sale for \$150.

1. Calculate the expected profit/loss for the manufacturer if this arrangement is continued over the long term.
2. Calculate the expected profit/loss for the retailer.
3. If the manufacturer wanted the mean profit per coat (i.e., the expected profit) to be more than \$30, what is the maximum reduction that can be offered per defect in the sample.