Specialty Toys

Specialty Toys, Inc., sells a variety of new and innovative children's toys. Management learned that the preholiday season is the best time to introduce a new toy, because many families use this time to look for new ideas for December holiday gifts. When Specialty discovers a new toy with good market potential, it chooses an October market entry date.

In order to get toys in its stores by October, Specialty places onetime orders with its manufacturers in June or July of each year. Demand for children's toys can be highly volatile. If a new toy catches on, a sense of shortage in the marketplace often increases the demand to high levels and large profits can be realized. However, new toys can also flop, leaving Specialty stuck with high levels of inventory that must be sold at reduced prices. The most important question the company faces is deciding how many units of a new toy should be purchased to meet anticipated sales demand. If too few are purchased, sales will be lost; if too many are purchased, profits will be reduced because of low prices realized in clearance sales.

For the coming season, Specialty plans to introduce a new product called Weather Teddy. This variation of a talking teddy bear is made by a company in Taiwan. When a child presses Teddy's hand, the bear begins to talk. A built-in barometer selects one of five responses that predict the weather conditions. The responses range from "It looks to be a very nice day! Have fun" to "I think it may rain today. Don't forget your umbrella." Tests with the product show that, even though it is not a perfect weather predictor, its predictions are surprisingly good. Several of Specialty's managers claimed Teddy gave predictions of the weather that were as good as many local television weather forecasters.

As with other products, Specialty faces the decision of how many Weather Teddy units to order for the coming holiday season. Members of the management team suggested order quantities of 13,000, 17,000, 26,000, or 29,000 units. The wide range of order quantities suggested indicates considerable disagreement concerning the market potential. The product management team asks you for an analysis of the stock-out probabilities for various order quantities, an estimate of the profit potential, and to help make an order quantity recommendation. Specialty expects to sell Weather Teddy for $29 based on a cost of $17 per unit. If inventory remains after the holiday season, Specialty will sell all surplus inventory for $7 per unit. After reviewing the sales history of similar products, Specialty's senior sales forecaster predicted an expected demand of 22,500 units with a 0.97 probability that demand would be between 7,000 units and 38,000 units.

Case Report

Prepare a case report that addresses the following issues and recommends an order quantity for the Weather Teddy product.

1. Use the sales forecaster's prediction to describe a normal probability distribution that can be used to approximate the demand distribution. Sketch the distribution and show its mean and variance. (10 points)

2. Compute the probability of a stockout for the order quantities suggested by members of the management team. (2.5 * 4 = 10 points)

3. Compute the projected profit for the order quantities suggested by the management team under three scenarios: worst case in which sales=12,000 units, most likely case in which sales=22,500 units, and best case in which sales=33,000 units. (4 * 3 = 12 points)

4. One of Specialty's managers felt that the profit potential was so great that the order quantity should have a 92% chance of meeting demand and only an 8% chance of any stockouts. What quantity would be ordered under this policy, and what is the projected profit under the three sales scenarios? (5 + 5 = 10 points)

5. Provide your own recommendation for an order quantity and note the associated profit projections. Provide a rationale for your recommendation. (3 + 3 + 2 = 8 points)

Format of the deliverables:

1. The typed case report must be in Microsoft Word or PDF format and uploaded on Canvas by the due date. Each group must upload only one report.
2. The typed case report must ***not*** contain any R code. The report must answer all the questions separately and sequentially.
3. <u>You must include graphs and/or tables as asked in the question, followed by a written analysis and interpretation.</u>
4. ***All*** computations must be done in R and the ***executable*** R script file must be uploaded on Canvas as well.
5. Please do not copy the questions from the case to your report. You should just answer the questions without typing the questions in your report.
6. The case report must be written in Times New Roman font with font size 12 and single-line space.
7. The number of pages in the written report must not exceed five (5) excluding the cover page (if any).
8. The names of all the participating group-members must be on the first page of the report.