Practice Problems on Inventory Management – Newsvendor

1. Johnson Electronics sells electrical and electronic components through catalogs. Catalogs are updated and printed twice every year. Each printing run incurs a fixed cost of $5,000, which involves catalog design cost and printing setup cost. The variable production cost is $5 per catalog. Annual demand for catalogs is estimated to be normally distributed with a mean of 16,000 and standard deviation of 4,000. Data indicate that, on average, each customer ordering a catalog generates a profit of $35 from sales. How many catalogs should be printed in each run?

2. As owner of Catch-of-the-Day Fish Shop, you can purchase fresh fish at $18 per crate each morning from the Walton Fish Market. During the day, you sell crates of fish to local restaurants for $120 each. Coupled with the perishable nature of your product, your integrity as a quality supplier requires you to dispose off each unsold crate at the end of the day. Your cost of disposal is $2 per crate. You have a problem, however, because you do not know how many crates your customers will order each day. To address this problem, you have collected several days' worth of demand data shown in the table below. You now want to determine the optimal number of crates you should purchase each morning.

Demand	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Frequency	0	0	0	1	3	2	5	1	6	7	6	8	5	4	1	3

3. The residents of Bucktown, Illinois, place their trash at the curb each Wednesday morning to be picked up by municipal crews. Experience shows that the total amount of trash put out has a normal distribution with a mean of 35 tons and a standard deviation of 9 tons. Crews of full-time city employees assigned to trash collection collect trash. Each crew can collect 5 tons of trash per working day. The city has plenty of trucks of the kind used for trash collection. The marginal cost of operating one trash collection crew for one working day, including both personnel-related costs and truck-related costs, is reckoned at $625. Whatever trash remains at the end of the work day *must* be collected that evening by an outside contractor who charges $650 per ton.

How many crews should the city assign to trash collection? For simplicity, treat the number of crews as a continuous variable.