

## Question A1

Worldwide Consumer Products (WCP) is evaluating whether to introduce a new product, code-named SQ45. New product introduction is quite risky. Typically, only 30% of all new products are successful with the remainder being unsuccessful.

- (a) In order to reduce the probability of losing a lot of money on an unsuccessful product, WCP could test market the product by introducing it in three cities across Canada. In the past, products that were successful in nationwide launch were also successful in test markets 80% of the time, while products that were unsuccessful when launch across the country, had been successful in test marketing 50% of the time. What would SQ45's probability of success be if it had a successful test market? What would SQ45's probability of success be if it had an unsuccessful test market?
- (b) WCP could conduct a series of focus groups with consumers to attempt to ascertain the likelihood of product success. Compared to test marketing, focus groups are far less costly, but not as reliable when it comes to predicting product success. Successful products have had positive focus group results 70% of the time, while unsuccessful products have had positive focus group results 60% of the time. What would SQ45's probability of success be if it had a positive focus group result? What would SQ45's probability of success be if it had a negative focus group result?

## Question A2

Patients displaying a particular set of symptoms have a specific, curable disease 40% of the time. The other 60% of the time the symptoms were caused by other benign factors. If the disease is not treated, it often will progress to a debilitating and often life-threatening condition. As a result, all patients displaying these symptoms receive the treatment. Although the treatment is safe to give to people without the disease, it is both expensive and uncomfortable for the patients. A lab has proposed a test that is accurate 90% of the time when the patient does have the disease and 80% of the time when the patient does not have the disease.

- (a) What is the probability of a false positive? (A false positive is when a test or diagnosis indicates a condition that is not actually present.)
- (b) If the test indicates the presence of the disease, what is the probability that the patient does, in fact, have the disease?
- (c) Why would this test be unlikely to change the course of treatment that doctors recommend?