1. Approximately 1% of women aged 40-50 have breast cancer. A woman with breast cancer has a 90% chance of a positive test from a mammogram, while a woman without has a 10% chance of a false positive result. What is the probability a woman has breast cancer given that she just had a positive test?

2. In a particular pain clinic, 10% of patients are prescribed narcotic pain killers. Overall, five percent of the clinic’s patients are addicted to narcotics (including pain killers and illegal substances). Out of all the people prescribed pain pills, 8% are addicts. If a patient is an addict, what is the probability that they will be prescribed pain pills?

3. Each bag in a large box contains 25 tulip bulbs. Three-fourths of the bags are of Type A containing bulbs for 5 red and 20 yellow tulips; one-fourth of the bags are of Type B contain bulbs for 15 red and 10 yellow tulips. A bag is selected at random and one bulb is planted.
   (a) What is the probability that the bulb will produce a red tulip?
   (b) What is the probability that the bulb will produce a yellow tulip?
   (c) If the tulip is red, what is the probability that a bag having 15 red and 10 yellow tulips was selected?

4. (a) A couple has two children, the older of which is a boy. What is the probability that they have two boys?
   (b) A couple has two children, one of which is a boy. What is the probability that they have two boys?
   (c) A couple has two children. Given that one of the children is a boy, and that he was born on a Tuesday, what is the probability that both children are boys?

5. A representative from the National Football League’s Marketing Division randomly selects people on a random street in Kansas City, Kansas until he finds a person who attended the last home football game. Let \( p \), the probability that he succeeds in finding such a person, equal 0.20. And, let \( X \) denote the number of people he selects until he finds his first success.
   (a) What is the probability that the marketing representative must select 4 people before he finds one who attended the last home football game?
   (b) What is the probability that the marketing representative must select more than 6 people before he finds one who attended the last home football game?