Quiz 2

Math 124

February 6, 2009

NAME: KEY

1. Let $E$ and $F$ be two events in $S$ with $P(E) = 0.4$, $P(F) = 0.6$ and $P(E \cup F) = 0.8$.

   (a) Find $P(E \cap F)$.

   $P(E \cup F) = P(E) + P(F) - P(E \cap F)$
   
   $0.8 = 0.4 + 0.6 - P(E \cap F)$
   
   $P(E \cap F) = 0.2$

   (b) Find $P(E \cap F^c)$.

   $P(E \cap F^c) = P(E) - P(E \cap F)$
   
   $= 0.4 - 0.2 = 0.2$
2. A company owns three factories. Factory A produces 30% of the products, and 4% of the products from factory A are defective. Factory B produces 30% of the products, and 6% of the products from factory B are defective. Factory C produces 40% of the products, and 2% of the products from factory C are defective.

(a) What is the probability that a product functions properly given that it was produced at factory B?

\[
P(D^c|B) = \frac{(0.3)(0.94)}{0.3} = 0.94
\]

(b) What is the probability that a random product from this company is defective?

\[
P(D) = P(D|A) + P(D|B) + P(D|C)
\]
\[
= (0.3)(0.04) + (0.3)(0.06) + (0.4)(0.02)
\]
\[
= 0.012 + 0.018 + 0.008 = 0.038
\]

3.8%