110 WORKSHEET (8.4)

Name __________________________________________

1. A factory has two machines that produce bolts. Machine I produces 60% of the bolts, and 3% of its bolts are defective. Machine II produces 40% of the bolts and 2% of its bolts are defective.

A. Draw a probability tree for the given information.

```
     1.00
    /     |
   /      |
  0.60   0.40
    I     II
    |
   0.97  0.02
     D'    D

     0.03
      D
```

B. If it is **given that** a bolt came from Machine I, what is the probability that it is defective? P(D|I)

\[ P(D|I) = 0.03 \]

C. What is the probability that a bolt selected at random came from Machine II and is defective? P(II \cap D)

\[ P(II \cap D) = 0.4(0.02) = 0.008 \]

D. What is the probability that a random bolt is defective? P(D)

\[ P(D) = 0.4(0.02) + 0.6(0.03) = 0.008 + 0.018 = 0.026 \]

E. **Given that** a bolt is defective, what is the probability that it came from Machine II? P(II|D)

\[ P(II|D) = \frac{0.008}{0.026} = 0.307 \]