EE 315 – Fall 2011(111)
Quiz 1

SER	ID	NAME **KEY**

Two Boxes with numerical balls as follows:

$A=\{1, 2, 3, 4\}$ $B=\{1, 2, 3, 4, 5\}$

A box is selected at random with probabilities :

$$P(A) = \frac{1}{3} \qquad P(B) = \frac{2}{3}$$

If a ball is selected randomly from the box that was selected and the balls are equal likely . Find the followings :

(a) $P(1|A)$?

(b) $P(1)$?

(c) $P(A|1)$?

(d) $P(5)$?

Solution

(a) $P(1|A)=\frac{1}{4}$

(b) $P(1)=P(1|A)P(A)+P(1|B)P(B)$

$$= \left(\frac{1}{4}\right)\left(\frac{1}{3}\right) + \left(\frac{1}{5}\right)\left(\frac{2}{3}\right)=\frac{13}{60}$$

(c) $P(A|1)=\frac{P(A\cap 1)}{P(1)}=\frac{P(1|A)P(A)}{P(1)}=\frac{\left(\frac{1}{4}\right)\left(\frac{1}{3}\right)}{\frac{13}{60}}=\frac{5}{13}$

(d) $P(5)=P(5|A)P(A)+P(5|B)P(B)$

$$= (0)\left(\frac{1}{3}\right) + \left(\frac{1}{5}\right)\left(\frac{2}{3}\right)=\frac{2}{15}$$