

1.6

$$p_0 = (1 - u)(1 - w), \quad p_1 = u(1 - w) + w(1 - u), \quad p_2 = uw,$$

$$p_0 = p_2 \quad \Rightarrow \quad u + w = 1$$

$$p_1 = p_2 \quad \Rightarrow \quad uw = 1/3.$$

These two equations imply $u(1 - u) = 1/3$, which has no solution in the real numbers. Thus, the probability assignment is not legitimate.

1.25 Enumerating the sample space gives $S' = \{(B, B), (B, G), (G, B), (G, G)\}$, with each outcome equally likely. Thus $P(\text{at least one boy}) = 3/4$ and $P(\text{both are boys}) = 1/4$, therefore

$$P(\text{ both are boys } | \text{ at least one boy }) = 1/3.$$

An ambiguity may arise if order is not acknowledged, the space is $S' = \{(B, B), (B, G), (G, G)\}$, with each outcome equally likely.