1. $p(T) = 1/4, p(H) = 3/4$

$p(6) = 1/16; p(2) = p(4) = 3/8$ **5.** $9/49$ **7.** **a)** $1/2$
b) $1/2$ **c)** $1/3$ **d)** $1/4$ **e)** $1/4$ **9.** **a)** $1/26!$ **b)** $1/26$ **c)** $1/2$

b) $1/2$ **c)** $1/3$ **d)** $1/4$ **e)** $1/4$ **9.** **a)** $1/26!$ **b)** $1/26$ **c)** $1/2$
d) $1/26$ **e)** $1/650$ **f)** $1/15{,}600$ **11.** Clearly, $p(E \cup F) \geq$

d) $1/26$ **e)** $1/650$ **f)** $1/15{,}600$ **11.** Clearly, $p(E \cup F) \geq$
$p(E) = 0.7$. Also, $p(E \cup F) \leq 1$. If we apply Theorem 2 from Section 7.1, we can rewrite this as $p(E)+p(F)-p(E \cap F) \leq 1$, or $0.7 + 0.5 - p(E \cap F) \leq 1$. Solving for $p(E \cap F)$ gives $p(E \cap F) \geq 0.2$. **13.** Because $p(E \cup F) = p(E)+p(F)-p(E \cap F)$

$p(E \cap F) \geq 0.2$. **13.** Because $p(E \cup F) = p(E)+p(F)-p(E \cap F)$
and $p(E \cup F) \leq 1$, it follows that $1 \geq p(E)+p(F)-p(E \cap F)$. From this inequality we conclude that $p(E) + p(F) \leq 1 + p(E \cap F)$. **15.** We will use mathematical induction to prove

ematical induction. **17.** Because $E \cup \overline{E}$ is the entire sample space S, the event F can be split into two disjoint events: $F = S \cap F = (E \cup \overline{E}) \cap F = (E \cap F) \cup (\overline{E} \cap F)$, using the distributive law. Therefore, $p(F) = p((E \cap F) \cup (\overline{E} \cap F)) = p(E \cap F) + p(\overline{E} \cap F)$, because these two events are disjoint. Subtracting $p(E \cap F)$ from both sides, using the fact that $p(E \cap F) = p(E) \cdot p(F)$ (the hypothesis that E and F are independent), and factoring, we have $p(F)[1 - p(E)] = p(\overline{E} \cap F)$. Because $1 - p(E) = p(\overline{E})$, this says that $p(\overline{E} \cap F) = p(\overline{E}) \cdot p(F)$, as desired. **19.** **a)** $1/12$

this says that $p(\overline{E} \cap F) = p(\overline{E}) \cdot p(F)$, as desired. **19.** **a)** $1/12$
b) $1 - \frac{11}{12} \cdot \frac{10}{12} \cdot \cdots \cdot \frac{13-n}{12}$ **c)** 5 **21.** 614 **23.** $1/4$ **25.** $3/8$

23. $1/4$

25. $3/8$

27. **a)** Not independent

29. $3/16$

35. **a)** p^n **b)** $1 - p^n$ **c)** $p^n + n \cdot p^{n-1} \cdot (1-p)$
d) $1 - [p^n + n \cdot p^{n-1} \cdot (1-p)]$ **37.** $p(\bigcup_{i=1}^{\infty} E_i)$ is the sum of