25. $\frac{4}{52}\cdot\frac{3}{51}=\frac{12}{2652}=\frac{1}{221}\approx 0.004525$

26. $\frac{13}{52}\cdot\frac{12}{51}=\frac{156}{2652}=\frac{1}{17}\approx 0.05882$

27. $\frac{1}{2}$; because the flip of the coin the fifth time is independent of the first four times.

28. $\frac{1}{2}$; because the flip of the coin the first time is independent of the second time.

29.
$$\Pr(\text{Kasich}|\text{Fem.})=\frac{\Pr(\text{Kasich and Fem.})}{\Pr(\text{Fem.})}$$
$$0.09=\frac{\Pr(\text{Kasich and Fem.})}{0.48}$$
$$\Pr(\text{Kasich and Fem.})=0.0432$$

30. $\Pr(\text{Shanghai})=0.016\cdot 0.2=0.0032$

31. $\Pr(\text{Win with 2 point shot})=0.48\cdot 0.5=0.24$

$\Pr(\text{Win with 3 point shot})=0.29$

Therefore, there is a better chance of winning if you take the three – point shot.

32. $\frac{2}{10}=\frac{1}{5}$

33. $\Pr(E\cap F)=0.4+0.5-0.7=0.2$

$$\Pr(E\mid F)=\frac{0.2}{0.5}=0.4=\Pr(E)$$

$$\Pr(F\mid E)=\frac{0.2}{0.4}=0.5=\Pr(F)$$

Therefore, the two events are independent.

34. $\Pr(E\cap F)=0.2+0.5-0.6=0.1$

$$\Pr(E\mid F)=\frac{0.1}{0.5}=0.2=\Pr(E)$$

$$\Pr(F\mid E)=\frac{0.1}{0.2}=0.5=\Pr(F)$$

Therefore, the two events are independent.

35. $\Pr(E\cap F)=(0.5)(0.6)=0.3$

$\Pr(E\cup F)=0.5+0.6-0.3=0.8$

36. $\Pr(E\cap F)=(0.25)(0.4)=0.1$

$\Pr(E\cup F)=0.25+0.4-0.1=0.55$

37. Since the events are independent,
$\Pr(F\mid E)=\Pr(F)=0.6$

38. Since the events are independent,
$$\begin{aligned}\Pr(F)&=1-\Pr(F'\mid E')\\&=1-\Pr(F')\\&=1-0.3\\&=0.7\end{aligned}$$

39. Since the events are independent,
$$\Pr(F)=\frac{\Pr(E\cap F)}{1-\Pr(E')}=\frac{0.1}{1-0.6}=\frac{0.1}{0.4}=0.25$$

40. Since the events are independent,
$$\Pr(F)=\frac{\Pr(E\cap F)}{\Pr(E)}=\frac{0.4}{0.8}=0.5$$

41. Since the events are independent,
$$\begin{aligned}\Pr[(A\cap B\cap C)']&=1-(0.4)(0.1)(0.2)\\&=1-0.008\\&=0.992\end{aligned}$$

42. Since the events are independent,
$$\Pr(B)=\frac{\Pr(A\cap B)}{\Pr(A)}=\frac{0.12}{0.2}=0.6$$

$$\Pr(C)=\frac{\Pr(A\cap C)}{\Pr(A)}=\frac{0.06}{0.2}=0.3$$

$$\begin{aligned}\Pr(B\cap C)&=\Pr(B)\Pr(C)\\&=(0.6)(0.3)\\&=0.18\end{aligned}$$

43. No; because the selection of the first ball affects the selection of the second ball.

44. No; because the selection of the first ball affects the selection of the second ball.

45. Yes; because $\Pr(E \cap F) = \Pr(E) \cdot \Pr(F)$.

46. No; because $\Pr(E \cap F) \neq \Pr(E) \cdot \Pr(F)$.

47. No; because $\Pr(E \cap F) \neq \Pr(E) \cdot \Pr(F)$.

48. No; because $\Pr(E \cap F) \neq \Pr(E) \cdot \Pr(F)$.

49. No; because $\Pr(E \cap F) \neq \Pr(E) \cdot \Pr(F)$.

50. **a.** $\dfrac{\Pr(\text{Both corr.})}{\Pr(\text{first corr.})} = \dfrac{0.7 + 0.8 - 0.9}{0.7} \approx 0.8571$

b. They are not independent because the value that the second test is correct given the first is correct is 0.8751 from part (a) but the probability that the second test is correct is 0.8.

51. a. $\Pr(\text{pass all}) = (0.80)(0.75)(0.60) = 0.36$

b. $\Pr(\text{pass first 2}) = (0.80)(0.75)(0.40) = 0.24$

$\Pr(\text{pass 1st and 3rd}) = (0.80)(0.25)(0.60) = 0.12$

$\Pr(\text{pass last 2}) = (0.2)(0.75)(0.60) = 0.09$

$\Pr(\text{pass} \geq 2) = 0.36 + 0.24 + 0.12 + 0.09 = 0.81$

52. $\Pr(\text{all correct}) = \left(\dfrac{1}{2}\right)^{10} = \dfrac{1}{1024} \approx 0.0009766$

53. $(0.99)^5(0.98)^5(0.975)^3 \approx 0.7967$

54. $(1-0.003)^{72} = (0.997)^{72} \approx 0.8055$

55. $(1-0.7)^4 = (0.3)^4 = 0.0081$

56. $(0.15)^3 = 0.003375$

$1-(0.85)^3 = 0.3860$

57. **a.** $1-(0.7)^4 = 1-0.2401 = 0.7599$

b. $(0.7599)^{10} \approx 0.06420$

c. $1-(0.9358)^{20} \approx 0.7347$

58. **a.** 0.64

b. $1-\left(\dfrac{37}{38}\right)^{38} \approx 0.6370$

59. Scoring 0: $1-0.6 = 0.4$

Scoring 1: $(0.6)(1-0.6) = 0.24$

Scoring 2: $(0.6)(0.6) = 0.36$

60. Scoring 0: $1-0.7 = 0.3$

Scoring 1: $(0.7)(1-0.7) = 0.21$

Scoring 2: $(0.7)(0.7) = 0.49$

61. Answer will vary.

62. Let p = the probability of success.

$$\begin{aligned} p(1-p) &= p \cdot p \\ p - p^2 &= p^2 \\ 0 &= 2p^2 - p \\ 0 &= p(2p-1) \\ p &= 0 \\ p &= 0.5 \end{aligned}$$

Since the probability cannot be 0, the probability must be 0.5.

63. $(0.6)(0.4) = 0.24$

$(0.4)(0.6) = 0.24$

Answers will vary

64. No; All flips of a fair coin are independent of each other.

65. Answers will vary.

66. Answers will vary.

67. Answers will vary.

68. Answers will vary.

69. 26; $1-\left(\dfrac{37}{38}\right)^{26} \approx 0.5001$