60) a. D = Aircraft discovered

E = Emergency located

$P(D) = 70\% = .7$

$P(E|D) = 60\% = .6$

$P(D') = 1 - P(D)$

$= 1 - .70 = \boxed{.3}$

$P(E|D') = 1 - P(E|D)$

$= 1 - .9$

$= \boxed{.1}$

$P(E) = P(D)P(E|D) + P(D')P(E|D')$

$= (0.7 \times .6) + (.3 \times .1) = \boxed{.45}$

$$P(D'|E) = \frac{P(D')P(E|D)}{P(E)}$$

$$= \frac{(.3 \times .1)}{.45} = \boxed{\frac{1}{15}}$$

b. $$P(D|E') = \frac{P(D)P(E|D)}{P(E)} = \frac{0.7 \times [1 - P(E|D)}{1 - P(E)}$$

$$= \frac{0.7(1 - 0.6)}{1 - 0.45}$$

$$= \frac{0.28}{.55} = \boxed{\frac{28}{55}}$$

78.

P(a valve will open on demand) = .96

number of valves = 5

P(all valves will open on demand) = $.96^5 = \boxed{.8154}$

P(at least one valve fails to open) = $1 - 0.8154 = \boxed{0.1846}$

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80. $P(S_1) = P(c_1 \cup c_2) \rightarrow P(c_1 \cup c_2) - P(c_1 \cap c_2) = .9 + .9 - (0.9)(0.9) =$

$P(S_2) = P[S_1 \cup S_2] = P(S_1) + P(S_2) - P(S_1 \cap S_2) = .9 \times .9 = \boxed{.81}$ $\boxed{.99}$

$P(S) < P[S_1 \cup S_2] = P(S_1) + P(S_2) - P(S_1 \cap S_2) = .99 + .81 - \{.99 \times .81\}$

$= \boxed{.9981}$ probability that system works