Exam 1

1. There are 16 possible equally likely outcomes. By counting, find

- \( P(6) = \frac{3}{16} \),
- \( P(8) = \frac{1}{16} \),
- \( P(10) = 0 \)

2. 

\[
P(I) = P(I|S)P(S) + P(I|T)P(T)
\]

\[
= (.8)(.6) + (.3)(.4) = .6
\]

\[
P(I|S)P(I) = P(I|T)P(T)
\]

\[
P(T|I)(.6) = (.3)(.4)
\]

\[
P(T|I) = \boxed{.2}
\]

3. 

\[
P(V \cup W) = P(V) + P(W) - P(V \cap W)
\]

- \( P(V \cap W) = P(V|W)P(W) = (.8)(.6) = .48 \)

\[
P(V \cup W) = .5 + .6 - .48 = .62
\]

4. 

- \( P(n \text{ all off by stop } m) = \left(\frac{m}{n}\right)^k \)

- \( P(n \text{ no one gets off at stop } m) = \left(\frac{n-1}{n}\right)^k \)

[Each person has chance \( \frac{m}{n} \) to get off by stop \( m \), etc.]

5. 

\[
P(8 \text{ men bowl}, 7 \text{ fish}, 5 \text{ yoga}) = \binom{20}{8,7,5} \binom{10}{4,3,3}
\]

\[
P(0 \text{ and } W \text{ on some team}) = \frac{\binom{28}{10,10,8} + \binom{28}{12,8,8} + \binom{28}{12,10,6}}{\binom{30}{12,10,8}}
\]
\( P_n \) (all colors appear) = \( 4! \left( \frac{6}{36} \right) \left( \frac{8}{36} \right) \left( \frac{10}{36} \right) \left( \frac{12}{36} \right) \)

\( P_n \) (all have same color) = \( P_n \) (all W) + ---

\[ = \left( \frac{6}{36} \right)^4 + \left( \frac{8}{36} \right)^4 + \left( \frac{10}{36} \right)^4 + \left( \frac{12}{36} \right)^4 \]

\( P_n \) (GWG) = \( \frac{10}{36} \cdot \frac{6}{35} \cdot \frac{9}{34} \)

\( P_n \) (at least one green) = 1 - \( P_n \) (no green) = 1 - \( \frac{26}{36} \cdot \frac{25}{35} \cdot \frac{24}{34} \)

\[ P = \begin{bmatrix} .6 & .4 \\ .3 & .7 \end{bmatrix} \text{ when snow = state 1} \]
\[ \text{Main = state 2} \]

\( \vec{v} = (.2, .8) \)

\( \vec{v} \cdot P = (.2, .8) \cdot P = (.36, .64) \)

\( P_n \) (snow tomorrow) = .36