Put answers in spaces provided unless otherwise stated. SHOW ALL WORK. (No Work = No Credit)
Remember that you lose points for sloppy work, not following directions, and unclear answers.
Simplify answers completely unless otherwise noted.

(4 points)
1. Simplify each. Box your answer.
   a. \(4! = 4 \cdot 3 \cdot 2 \cdot 1 = 24\)
   b. \(\frac{100!}{98!} = \frac{100 \cdot 99 \cdot 98!}{98!} = 100 \cdot 99 = 9900\)

(6 points)
2. The Math Club has 20 members, but only 7 members are willing to be considered for additional duties such as being on a committee or being elected for an office.
   a. Considering only those 7 people, how many different committees of 3 people can be formed? Box your answer.
      \(\binom{7}{3} = \frac{7!}{3! \cdot 4!} = \frac{7 \cdot 6 \cdot 5 \cdot 4!}{3 \cdot 2 \cdot 1 \cdot 4!} = \frac{7 \cdot 6 \cdot 5}{6} = \boxed{35 \text{ committees}}\)
   b. Considering only those 7 people, how many ways could a president, vice president and treasurer be chosen if no one may be elected to more than one office? Box your answer.
      \(\text{P}_{7,3} = \frac{7!}{4!} = \frac{7 \cdot 6 \cdot 5 \cdot 4!}{4!} = \boxed{210 \text{ ways}}\)
3. A combination lock has 3 wheels, each labeled with the 10 digits from 0 to 9. If an opening combination is a sequence of 3 digits with no repeats, what is the probability of a person guessing the correct combination?

\[10 \cdot 9 \cdot 8 = 720\]

\[P(\text{correct}) = \frac{1}{720}\]

(11 points)

4. An experiment consists of rolling 2 dice and adding the dots on the 2 sides facing up. Find the probability of rolling the indicated sum.

a. the sum is 2.

\[P(\text{sum} = 2) = \frac{1}{36}\]

b. the sum is less than 5.

\[P(\text{sum} < 5) = \frac{1 + 2 + 3}{36} = \frac{6}{36} = \frac{1}{6}\]

c. the sum is 7 or 11.

\[P(7 \text{ or } 11) = \frac{6 + 2}{36} = \frac{8}{36} = \frac{2}{9}\]

d. the sum is not 7 nor 11.

\[P(\text{not } 7 \text{ nor } 11) = 1 - \frac{2}{9} = \frac{7}{9}\]