① PESACH

The first 5 letters can be a combination of $6 \times 5 \times 4 \times 3 \times 2 = 720$

The final letter can only be one letter because all the others have been used

② The roll has 6 sides, probability of rolling a six when the die is rolled once is $\frac{1}{6}$

when rolled 4 times, each time has a probability of $\frac{1}{6}$

Probability $= \frac{1}{6} \times \frac{1}{6} \times \frac{1}{6} \times \frac{1}{6} = \frac{1}{1296}$

3. Probability of landing a 5 in a single roll $= \frac{1}{6}$

4 consecutive times $= \frac{1}{6} \times \frac{1}{6} \times \frac{1}{6} \times \frac{1}{6} = \frac{1}{1296}$

Probability of not getting a 5 $= 1 - \frac{1}{1296} = \frac{1295}{1296}$

4. Consultant fees $= 10000$

Income $= 40000$

Chance of winning $= 30\%$

Expect gain $= 40000 - 10000 = 30000$

Probability of winning $= 0.3$, ∴ Expected gain $= 30000 \times 0.3 = 9000$

5. A heart — wins \$10

Queen of spades — wins \$15

Spade lose \$5

Probability of picking a heart $= \frac{13}{52}$ because there are 13 hearts in a pack

Probability of picking a Queen of spades $= \frac{1}{52}$ because it is only one

Probability of picking a losing spade $= \frac{12}{52}$ because one is a winning card $= \frac{3}{13}$

Value of this card game $= 10 \times \frac{1}{4} + 15 \times \frac{1}{52} - 5 \times \frac{3}{13} = \$ 1.6346$

$= \$ 1.63$