1) Probabilité que j'obtienne 1 roi :

$$p(\text{Roi}) = \frac{4}{32} = \frac{1}{8}, \text{ donc } p = \frac{1}{8} \text{ et } q = 1 - \frac{1}{8} = \frac{7}{8}$$

$$p(X = 3 \text{ Rois}) = C_n^k p^k q^{n-k} = C_{10}^3 + \left(\frac{1}{8}\right)^3 + \left(7/8\right)^7$$

$$= \frac{10!}{3!7!} + \frac{7^7}{8^{10}} = \frac{10+3+8+7^7}{3+2+8^{10}} = \frac{1+3+7^7}{2+8^9}$$

$$= \frac{15+7^7}{8^9}$$

$$= \underline{0,092}$$

2) Probabilité d'avoir 1 pique

$$p(\text{Pique}) = \frac{8}{32} = \frac{1}{4}, \text{ donc } p = 1/4 \text{ et } q = 3/4$$

$$p(X = 5 \text{ piques}) = C_{10}^5 + (1/4)^5 + (3/4)^5 = \frac{10!}{5!5!} + \frac{3^5}{4^{10}}$$

$$= \frac{10+9+8+7+6}{5+4+3+2+1} + \frac{3^5}{4^{10}} = 0,058$$

3) Probabilité Aucune figure

$$p(\text{Aucune Figure}) = \frac{20}{32} = \frac{10}{16} = \frac{5}{8}$$

$$p(\text{Pas de Figure}) = C_{10}^{10} (5/8)^{10} = \left(\frac{5}{8}\right)^{10} = 0,009$$

4) $p(4 \text{ as}) = C_{10}^4 (1/8)^4 (7/8)^6 = \frac{10!}{6!4!} + (1/8)^4 + (7/8)^6 = \frac{10+9+8+7}{4+3+2+1} \times \frac{7^6}{8^{10}}$

$= 0,023$

5) $p(8 \text{ coeurs}) = C_{10}^8 (1/4)^8 + (3/4)^2$