

$$(a) \text{ odds} = \frac{3}{13}$$

$$\text{Probability} = \frac{3}{13+3} = \frac{3}{16}$$

$$(b) P = \frac{11}{19}$$

$$\text{Odds} = \frac{19-11}{11} = \frac{8}{11}$$

(c) six-sided dice

$$P(X < 5) = \frac{4}{6} = \frac{2}{3}$$

Expected value

$$= 1\left(\frac{1}{8}\right) + 2\left(\frac{1}{8}\right) + 3\left(\frac{1}{8}\right) + 4\left(\frac{1}{8}\right) + 5\left(\frac{1}{8}\right) - 1\left(\frac{1}{8}\right) - 1\left(\frac{1}{8}\right) - \frac{1}{8}(t)$$

$$= 1.5 \text{ dollars}$$

Ivan can expect to gain money

0.1875 dollars per selection.

$$9C4 = 126$$

$$11P4 = 7920$$