NOME: FELIPE ANCHANOU DA CUNHA MENDES

RA: 2252740

LISTA 2

① $P = \frac{1}{2} \cdot \frac{3}{5} = \frac{3}{10} = 30\%$

②

URNA
- $A: \frac{1}{3}$
  - $V: 3/8$
  - $B: 5/8$
- $B: \frac{1}{3}$
  - $V: 2/3$
  - $B: 1/3$
- $C: \frac{1}{3}$
  - $V: 2/5$
  - $B: 3/5$

$$P(A/V) = \frac{P(A \cap V)}{P(V)}$$

$$P(V) = P(A) \cdot P(V/A) + P(B) + P(V/B) + P(C) + P(V/C)$$

$$= \frac{1}{3} \cdot \frac{3}{8} + \frac{1}{3} \cdot \frac{2}{3} + \frac{1}{3} \cdot \frac{2}{5}$$

$$P(A \cap V) = \frac{1}{3} \cdot \frac{3}{8}$$

$$P(A/V) = \frac{\frac{1}{3} \cdot \frac{3}{8}}{\frac{1}{3}\left(\frac{3}{8} + \frac{2}{3} + \frac{2}{5}\right)} = \frac{45}{173} = 0,26 = 26\%$$

③ Poissón

$$P(X=K) = \frac{e^{-\lambda} \cdot \lambda^{K}}{K!}$$

a) $P(X>2) = 1 - P(X\leq 2)$

$$= 1 - \left(\frac{e^{-5} \cdot 5^{0}}{0!} + \frac{e^{-5} \cdot 5^{1}}{1!} + \frac{e^{-5} \cdot 5^{2}}{2!} \right)$$

$$= 1 - 0{,}1246 = 0{,}8754$$

b) $\lambda = 5/h \rightarrow \lambda = 5 \cdot 8 = 40/\text{dia}$

$$P(X=50) = \frac{e^{-40} \cdot 40^{50}}{50!} = 0{,}0177$$

④ Binomial

a)

$p = 1/4 \quad q = 3/4$

$n = 10$

$$P(X\geq 6) = P(X=6) + P(X=7) + P(X=8) + P(X=9) + P(X=10)$$

$$P(X=6) = C_{10,6} \cdot \left(\frac{1}{4}\right)^{6} \cdot \left(\frac{3}{4}\right)^{4} = \frac{8505}{524288} = 0{,}016222$$

$$P(X=7) = C_{10,7} \left(\frac{1}{4}\right)^{7} \cdot \left(\frac{3}{4}\right)^{3} = \frac{405}{131072} = 0{,}0030899$$

$$P(X=8) = C_{10,8} \cdot \left(\frac{1}{4}\right)^{8} \cdot \left(\frac{3}{4}\right)^{2} = \frac{405}{1048576} = 0{,}000386238$$

$$P(X=9) = C_{10,9} \cdot \left(\frac{1}{4}\right)^{9} \cdot \left(\frac{3}{4}\right)^{1} = \frac{15}{2^{19}} = 2{,}86102 \cdot 10^{-5}$$

$$P(X=10) = C_{10,10} \cdot \left(\frac{1}{4}\right)^{10} \cdot \left(\frac{3}{4}\right)^{0} = \frac{1}{4^{10}} = 9{,}53 \cdot 10^{-7}$$

b)

$p = \frac{1}{2} \quad q = 1/2$

$n = 10$

$P(X \geq 6) = P(x=6) + P(x=7) + P(x=8) + P(x=9) + P(x=10)$

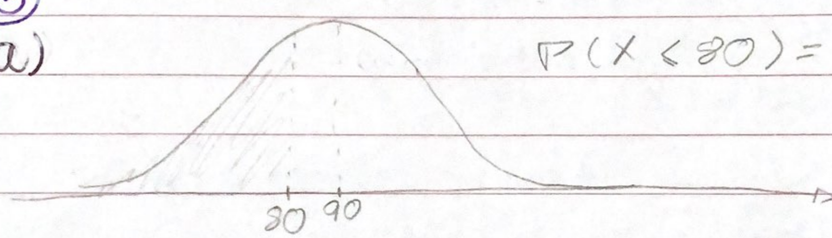
$P(x=6) = C_{10,6} \cdot \left(\frac{1}{2}\right)^6 \cdot \left(\frac{1}{2}\right)^4$

$\vdots$

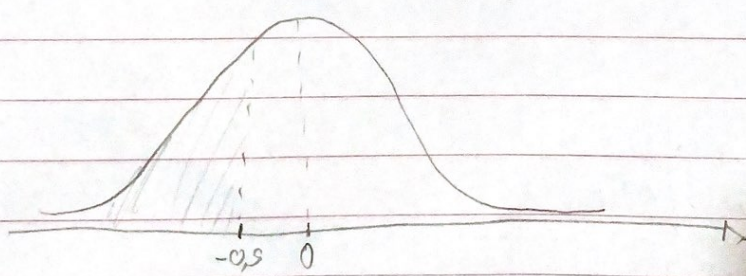
$P(x \geq 6) = \left(\frac{1}{2}\right)^{10} \cdot \left(C_{10,6} + C_{10,7} + C_{10,8} + C_{10,9} + C_{10,10}\right)$

5

a) $P(X < 80) = ?$



$$z = \frac{80 - 90}{20} = \frac{-10}{20} = -0{,}5$$

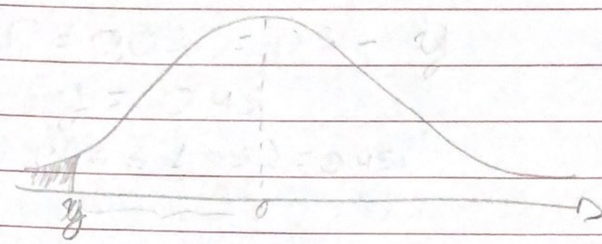


$P(X < 80) = P(Z < -0{,}5) = 0{,}5 - 0{,}1915$

$= 0{,}3085$

$= 30{,}85\%$

b)



$0,05 = 0,5 - P(y \geq z \geq 0)$

$P(y \geq z \geq 0) = 0,5 - 0,05$

$= 0,45$

$y = -1,65$

$-1,65 = \frac{X - 90}{20} \therefore -33 = X - 90$

$X = 57$ min

PARA OBTER ESSA POSIÇÃO, OS CANDIDATOS DEVIAM TER FEITO O TESTE EM MENOS DE 57 min

6

MÁQUINAS:
- A: $\frac{60}{100}$
  - D: 2/100
  - $\bar{D}$: 98/100
- B: $\frac{30}{100}$
  - D: 3/100
  - $\bar{D}$: 97/100
- C: $\frac{10}{100}$
  - D: 4/100
  - $\bar{D}$: 96/100

$P(C|D) = \frac{P(C \cap D)}{P(D)}$

S T Q Q S S D __/__/__

* $P(C \cap D) = \frac{10}{100} \cdot \frac{4}{100} = \frac{40}{10000} = \frac{4}{1000}$

* $P(D) = P(A) \cdot P(D/A) + P(B) \cdot P(D/B) + P(C) \cdot P(D/C)$

$= \frac{60}{100} \cdot \frac{2}{100} + \frac{30}{100} \cdot \frac{3}{100} + \frac{4}{1000}$

$= \frac{25}{1000}$

* $P(C/D) = \frac{4}{1000} \cdot \frac{1000}{25} = \frac{4}{25} = 16\%$ //

(7)

a)

3 CRIANÇAS

MMM MMm

mmm Mmm

FAMILIA A: FAMILIA B:

MMm MMM

Mmm MMm

* $P(A \cap B) = 1/4$

* $P(A) = 2/4 = 1/2$

* $P(B) = 2/4 = 1/2$

* $P(A) \cdot P(B) = \frac{1}{2} \cdot \frac{1}{2} = 1/4$

COMO $P(A) \cdot P(B) = P(A \cap B)$, ENTÃO A RELAÇÃO É DE INDEPENDENCIA.

spiral

__/__/__

S T Q Q S S D

e)

2 CRIANÇAS

MM Mm

mm

FAMILIA A: FAMILIA B:

Mm MM Mm

* $P(A \cap B) = 1/3$

* $P(A) = 1/3$

* $P(B) = 2/3$

COMO $P(A) \cdot P(B) = \frac{1}{3} \cdot \frac{2}{3} = \frac{2}{9} \neq P(A \cap B)$, ENTÃO

A RELAÇÃO É DE DEPENDÊNCIA.

8

$S: 60/100 \begin{cases} A: 1 \\ \bar{A}: 0 \end{cases}$

$\bar{S}: 40/100 \begin{cases} A: 20/100 \\ \bar{A}: 80/100 \end{cases}$

* $P(A) = P(S) \cdot P(A/S) + P(\bar{S}) \cdot P(A/\bar{S})$

$= \frac{60}{100} \cdot 1 + \frac{40}{100} \cdot \frac{20}{100}$

$= \frac{60}{100} + \frac{800}{10000} = \frac{60}{100} + \frac{8}{100}$

$= 0{,}68 = 68\%$

spiral