

## Prova 2 - Estatística

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1)	X	1	2	3	4
	P(X)	c	$\frac{c}{2}$	$\frac{c}{3}$	$\frac{c}{4}$

$$i) c + \frac{c}{2} + \frac{c}{3} + \frac{c}{4} = 1$$

$$\frac{12c + 6c + 4c + 3c}{12} = 1$$

$$\frac{25c}{12} = 1$$

$$25c = 12$$

$$c = \frac{12}{25} = 0,48$$

$$R: c = \frac{12}{25} = 0,48$$

$$ii) E(X) = \sum x_i \cdot p(x_i)$$

$$E(X) = c + 2 \cdot \frac{c}{2} + 3 \cdot \frac{c}{3} + 4 \cdot \frac{c}{4}$$

$$E(X) = 4c$$

$$E(X) = 4 \cdot \frac{12}{25}$$

$$E(X) = \frac{48}{25} = 1,92$$

$$R: \frac{48}{25} = 1,92$$

$$\text{var}(X) = E(X^2) - [E(X)]^2$$

$$\text{var}(X) = \sum x_i^2 \cdot p(x_i) - [E(X)]^2$$

$$\text{var}(X) = 1^2 \cdot c + 2^2 \cdot \frac{c}{2} + 3^2 \cdot \frac{c}{3} + 4^2 \cdot \frac{c}{4} - \left(\frac{48}{25}\right)^2$$

$$\text{var}(X) = c + 2c + 3c + 4c - \frac{2304}{625}$$

$$\text{var}(X) = 10c - \frac{2304}{625}$$

$$\text{var}(X) = 10 \cdot \frac{12}{25} - \frac{2304}{625}$$

$$R: \text{var}(X) = \frac{696}{625} = 1,136$$

$$\text{var}(X) = \frac{120}{25} - \frac{2304}{625}$$

$$\text{var}(X) = \frac{3000}{625} - \frac{2304}{625} = \frac{696}{625} = 1,136$$

2)  $p = 0,75$   $q = 0,25$   $n = 3$

X	P(X)	
0	0,0156	$P(X=0) = \binom{3}{0} 0,75^0 \cdot 0,25^3 = 0,0156$
1	0,1406	$P(X=1) = \binom{3}{1} 0,75^1 \cdot 0,25^2 = 0,1406$
2	0,4219	$P(X=2) = \binom{3}{2} 0,75^2 \cdot 0,25^1 = 0,4219$
3	0,4219	$P(X=3) = \binom{3}{3} 0,75^3 \cdot 0,25^0 = 0,4219$

a)  $P(X \leq 1) = P(X=0) + P(X=1)$

$$P(X \leq 1) = 0,0156 + 0,1406$$

$$P(X \leq 1) = 0,1562$$

R:  $P(X \leq 1) = 0,1562$

b)  $P(X \geq 2) = P(X=2) + P(X=3)$

$$P(X \geq 2) = 0,4219 + 0,4219$$

$$P(X \geq 2) = 0,8438$$

R:  $P(X \geq 2) = 0,8438$

3) 2 petroleiros por dia

$$\lambda = 2$$

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

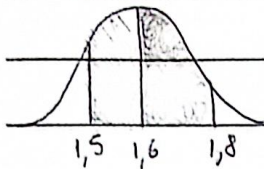
$$P(X > 3) = 1 - P(X \leq 3) = 1 - P(X=0) - P(X=1) - P(X=2) - P(X=3)$$

$P(X=0) = \frac{e^{-2} \cdot 2^0}{0!} = 0,1353$	$1 - 0,1353 - 0,2707 - 0,2707 - 0,1804$
	$1 - 0,8571$
$P(X=1) = \frac{e^{-2} \cdot 2^1}{1!} = 0,2707$	$0,1429$
$P(X=2) = \frac{e^{-2} \cdot 2^2}{2} = 0,2707$	$P(X > 3) \approx 0,1429$
$P(X=3) = \frac{e^{-2} \cdot 2^3}{6} = 0,1804$	Probabilidade é de 14,29%
<b>tilibra</b>	



$$4) X \sim N(1,6; 0,3^2)$$

a) entre 1,50 e 1,80



$$z = \frac{1,5 - 1,6}{0,3} = -0,33$$

$$z = \frac{1,8 - 1,6}{0,3} = 0,67$$

$$P(-0,33 < z < 0,67)$$

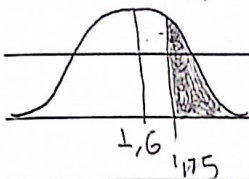
$$P(z > 0,33) + P(z < 0,67)$$

$$0,1293 + 0,2486$$

$$0,3779$$

$$R: P(-0,33 < z < 0,67) = 0,3779$$

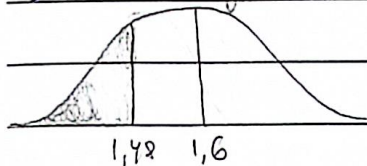
b) mais que 1,75



$$z = \frac{1,75 - 1,6}{0,3} = 0,50$$

$$P(z > 0,50) = 0,3085$$

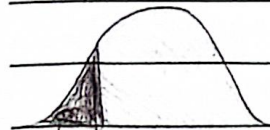
c) menos que 1,48



$$z = \frac{1,48 - 1,6}{0,3} = -0,12 = -0,4$$

$$P(z < -0,4) = 0,3446$$

$$5) X \sim N(9,4; 4,2^2)$$



$$0,33 \rightarrow z = -0,44$$

$$-0,44 = \frac{x - 9,4}{4,2}$$

$$x - 9,4 = -1,848$$

$$x = 7,552$$

$$R: 7,552 \text{ toneladas}$$