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- Distribuição normal

Lista de Exercícios 04 (Normal)

1.

a) $P(0 \leq z \leq 1) = 34134 = \boxed{34,13\%}$

b) $P(-2,55 \leq z \leq 1,2) = 49461 + 38493 = 87954 = \boxed{87,95\%}$

c) $P(z \geq 1,93) = 0,5 - 0,47320 = 0,0268 = \boxed{2,68\%}$

d) $P(z \leq 1,93) = 0,5 + 0,47320 = 0,9732 = \boxed{97,32\%}$

2. $Z = \dfrac{X - \mu}{\sigma}$ 　　 $\mu = 120$　$\sigma = 8$

a) $z = \dfrac{110 - 120}{8} = \dfrac{-10}{8} = -1,25$ 　　 $z = \dfrac{130 - 120}{8} = \dfrac{10}{8} = 1,25$

$P(-1,25 \leq X \leq 1,25) = 39435 + 39435 = 78870 = \boxed{78,87\%}$

b) $z = \dfrac{140 - 120}{8} = \dfrac{20}{8} = 2,5$

$P(z \geq 2,5) = \;\;\;\;\;\;\;\; 0,5 - 0,49379 = 0,00621 = \boxed{0,62\%}$

3. $\mu = 850$ 　 $\sigma = 45$

$Z = \dfrac{700 - 850}{45} = \dfrac{-150}{45} = -3,33$ 　　 $z = \dfrac{1000 - 850}{45} = \dfrac{150}{45} = 3,33$

$P(-3,33 \leq z \; 3,33) = 0,4996 + 0,4996 = 0,9992 = \boxed{99,92\%}$

b) $Z = \dfrac{850-850}{45} = \underline{0}$ $P(Z \geq 0) = 0,5 = \boxed{50\%}$

c) $\dfrac{750-850}{45} = \dfrac{-100}{45} = -2,22$

$P(-2,22 \overset{\geq}{} Z) = \cancel{0,1141} = \cancel{148,871\,M}$

$= 0,5 - 0,4868 = 0,0132 = \boxed{1,32\%}$

④ $\mu = 200$ $\sigma = 20$

$Z = \dfrac{200-200}{20} = \underline{0}$ $Z = \dfrac{225-200}{20} = \dfrac{25}{20} = \underline{1,25}$

$P(0 \leq Z \leq 1,25) = 0,3944 = \boxed{39,44\%}$

$Z = \dfrac{190-200}{20} = \dfrac{-10}{20} = -0,5$

$P(Z \leq -0,5) = 0,5 - 0,1915 = 0,3085 = \boxed{30,85\%}$

⑤ $\mu = 1,60$ $\sigma = 0,30$

a) $Z = \dfrac{1,5-1,6}{0,3} = \dfrac{-0,1}{0,3} = -0,33$ $Z = \dfrac{1,8-1,6}{0,3} = \dfrac{0,2}{0,3} = 0,67$

$P(-0,33 \leq Z \leq 0,67) = 0,1293 + 0,2486 = 0,3779 = \boxed{37,79\%}$

b) $Z = \dfrac{1,75-1,6}{0,3} = \dfrac{0,15}{0,3} = 0,5$

$P(Z \geq 0,5) = \cancel{0,212106} \, 0,5 - 0,1915 = 0,3085 = \boxed{30,85\%}$

c) $Z = \dfrac{1,48-1,60}{0,3} = \dfrac{-0,12}{0,3} = -0,4$

$P(Z \leq -0,4) = 0,5 - 0,1554 = 0,3446 = \boxed{34,46\%}$

②

d) $10\% = 0,1000 = 0,5 - 0,4$

$\qquad\qquad\qquad\qquad\qquad \rightarrow 1,28 \Rightarrow \underline{P(z \geq 1,28)}$

$\dfrac{X - 1,6}{0,3} = 1,28 \rightarrow X - 1,6 = 0,384 \Rightarrow X = 1,6 + 0,38 = \underline{1,98\,m}$

$\boxed{X = 1,98\,m}$

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⑥ $\mu = 50 \qquad \sigma = 10$

a) $Z = \dfrac{30 - 50}{10} = \dfrac{-20}{10} = -2$

$P(Z \geq -2,0) = 0,5 + 0,4772 = 0,9772 = \boxed{97,72\%}$

b) $P(Z \leq -2,0) = 0,5 - 0,4772 = 0,0228 = \boxed{2,28\%}$

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⑦ $\mu = 50 \qquad \sigma = 2,5$

a) $Z = \dfrac{48 - 50}{2,5} = -\dfrac{2}{2,5} = -0,8$

$P(Z \leq -0,8) = 0,5 - 0,2881 = 0,2119 = \boxed{21,19\%}$

b) $\dfrac{52 - 50}{2,5} = \dfrac{2}{2,5} = 0,8$

$P(Z \geq 0,8) = 0,5 - 0,2881 = 0,2119 = \boxed{21,19\%}$

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⑧ $X \sim N(12, 25)$

$\mu = 12 \qquad \sigma^2 = 25 \rightarrow \sigma = \sqrt{25} = 5$

a) $\dfrac{-3 - 12}{5} = \dfrac{-15}{5} = -3 \qquad P(Z \leq -3) = 0,5 - 0,4986 = 0,0014 =$

$\boxed{0,14\%}$

③

b) $z = \dfrac{-1 - 12}{5} = \dfrac{-13}{5} = -2{,}6$ $\qquad$ $z = \dfrac{15 - 12}{5} = \dfrac{3}{5} = 0{,}6$

$P(-2{,}6 \leq z \leq 0{,}6) = 0{,}4953 + 0{,}2258 = 0{,}7211 = \boxed{72{,}11\%}$

④