1) $P(x) = c$ where c is a constant

example: dice roll

$P(\text{each side}) = \frac{1}{6}$

2) $z = 0$

3) $\mu = 0.08$

$\sigma = 0.12$

$P(x < 0.05) = P\left(z < \frac{0.05 - 0.08}{0.12}\right) = P(z < -0.25) = 0.40$

$= 40\%$

4) $P(6 \text{ rolled} \geq 20 \text{ times}) = ?$

$P(6) = \frac{1}{6}$

$P(\text{Not } 6) = \frac{5}{6}$

$P(6 \geq 20 \text{ times}) = 1 - P(6 < 20 \text{ times})$

$P(6 < 20 \text{ times}) = P(6 = 0 \text{ times}) + P(6 = 1 \text{ time}) + P(6 = 2 \text{ times}) + \ldots P(6 = 19)$

$= \left(\frac{5}{6}\right)^{100} + \left(\frac{1}{6}\right)^{1}\left(\frac{5}{6}\right)^{99} + \left(\frac{1}{6}\right)^{2}\left(\frac{5}{6}\right)^{98} + \ldots + \left(\frac{1}{6}\right)^{19}\left(\frac{5}{6}\right)^{81}$

4) $P(\text{Getting } 6 \geq 20 \text{ times}) = 1 - (P(\text{Getting } 6 < 20 \text{ times}))$

$P(6) = \frac{1}{6}$

$P(\text{Not } 6) = 1 - \frac{1}{6} = \frac{5}{6}$

<20

$P(\text{Getting } 6 = 0 \text{ times}) = \left(\frac{5}{6}\right)^{100}$

$P(\text{Getting } 6 = 1 \text{ times}) = 100 \times \left(\frac{1}{6}\right)^{1} \times \left(\frac{5}{6}\right)^{99}$

$P(\text{Getting } 6 = 2 \text{ times}) = \frac{100!}{2!\,(100-2)!} \times \left(\frac{1}{6}\right)^{2} \times \left(\frac{5}{6}\right)^{98}$

$+$

$\vdots$

$+$

$P(\text{getting } 6 = 19 \text{ times}) = \frac{100!}{19!\,(81!)} \times \left(\frac{1}{6}\right)^{19} \times \left(\frac{5}{6}\right)^{81}$

$\therefore P(\text{getting } 6 \geq 20 \text{ times}) = 1 - \left\{ {}^{100}C_0 \left(\frac{5}{6}\right)^{100} + {}^{100}C_1 \left(\frac{1}{6}\right)\left(\frac{5}{6}\right)^{99} + {}^{100}C_2 \left(\frac{1}{6}\right)^{2}\left(\frac{5}{6}\right)^{98} + \dots + {}^{100}C_{19} \left(\frac{1}{6}\right)^{19}\left(\frac{5}{6}\right)^{81} \right\}$

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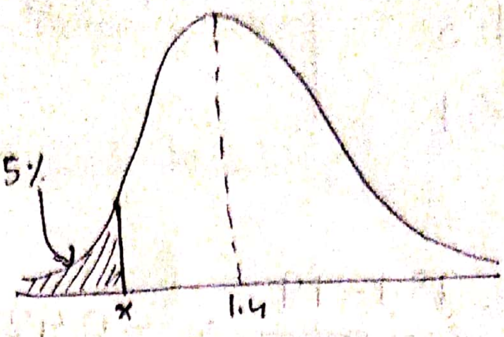
5) Watch & learn

6) $\mu = 1.4$

$\sigma = 0.3$



$P(p) = 0.05$

or $P\left(\frac{Z-1.4}{0.3}\right) = 0.05$

or $Z = 0.3 \times \underline{-1.64} + 1.4 = 0.91$

7) t-test is used to compare means

8) $\mu = 800$

$\sigma = 50$

$P(t > 900) = P\left(z > \frac{900-800}{50}\right) = P(z > 2) = 1 - P(z < 2)$

$= 1 - 0.977 = 0.033$

$= 3\%$

9) $\mu = 1200$

$\sigma = 100$

$n = 36$

$\bar{x} = 1180$

$s = 80$

$H_0: \mu = 1200$

$H_1: \mu \neq 1200$

$\alpha = 0.01$

~~Critical z =~~

$Z = \frac{1180-1200}{100} = -0.2$

P-value $= 1 - 0.42$ $[> 0.05]$

So, we fail to reject the null that the university's claim is correct

10) $n = 40$ | $H_0 : \mu \geq 19$

$\bar{x} = 18.1$ | $H_1 : \mu < 19$

$s = 1.3$

$\sigma = 2.1$

$$Z = \frac{18.1 - 19}{2.1} = -0.429$$

$$P(z \geq -0.429) = 1 - P(z < -0.429)$$

$$= 1 - 0.336$$

$$= 0.664 \ (> 0.05)$$

So, we fail to reject the null that mean age is at least 19