ASS-14

1) $f(x) = 20\, e^{-20(d-12.5)}$

limit : 12.5 to 12.6

$$\Rightarrow \int_{12.5}^{12.6} 20\, e^{-20(d-12.5)}\, dx$$

$$\Rightarrow \cancel{20}\left[\frac{1}{-\cancel{20}}\, e^{-20(d-12.5)}\right]_d$$

$$\begin{array}{r} 12.6- \\ 12.5 \\ \hline 0.1 \end{array}$$

$$\Rightarrow -\left[e^{-20(d-12.5)}\right]_{12.5}^{12.6}$$

$$\Rightarrow -\left[e^{-20(12.5-12.5)}\right] + e^{-20(12.6-12.5)}\Big]$$

$$\Rightarrow -\left[-e^{-20(0)} + e^{-20(0.1)}\right]$$

$$\Rightarrow -[e^{0} + e^{-2}]$$

$$= -[-1 + e^{-2}]$$

$$= 1 - e^{-2}$$

$$= 0.863$$

Area $= 1 - 0.863$

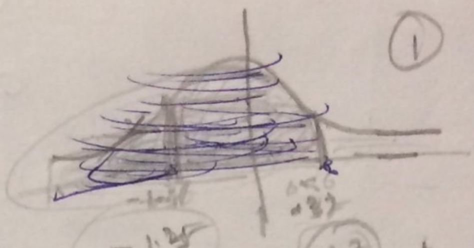
Area $= 0.137$

CDF of 11 is zero due it will not lies

Q2) i) $P(Z > 1.26)$

$= 1 - 0.8962$

$\simeq 0.11$



-1.25 $.37$

$1 - (P\ 0.37 \cdot 37$

$z = 0.37$ $1 - 3.7 +$

0.644 1.25

ii) $P(Z < -0.86) = 1 - 0.805$

$\simeq 0.195$

iii) $P(Z > -1.37) = 1 - 0.9147$

$\simeq 0.17$

iv) $P(-1.25 < Z < 0.37) = (1 - 0.8944) + 0.644)$

$= 0.21 + 0.64$

$\simeq 0.85$

b) $P(Z > z) = 0.05)$ $= 1 - 0.05$

$= \underline{0.95}$

$z = \underline{1.65}$

c) find the valle $(-z < Z < z) = 0.99$

$= (-\infty < Z < 2.33)$

$= 0.99$

Scanned with CamScanner

Q3) Normal Distribution:

a)

$\mu = 10$

$\sigma^2 = 4$

$x = 13$

$z = \frac{13-10}{2}$

$= 3/2$

$= 1.5$

$z = 0.9332$

$P(z > 1.5) = 1 - 0.9332$

$\simeq 0.07$

c) probability of 0.98

$P(x) = 0.98$

$z = 2.06$

$\frac{x-\mu}{\sigma} = 2.06$

$\frac{x-10}{2} = 2.06$

$x - 10 = 4.12$

$x = 14.12$

b)

$x = 9, 11$

$\sigma = 4$

$z = \frac{9-10}{2}$ | $z = \frac{11-10}{2}$

$= -1/2$ | $= 1/2$

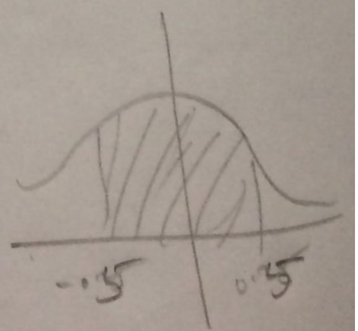
$= -0.5$ | $= 0.5$

$P(-0.5 < z < 0.5) =$

$= 0.6915 - (1 - 0.6915)$

$= 0.6915 - 0.31$

$\simeq 0.38$



4) $\mu = 0.2508$

$\sigma = 0.0005$

shaft are 0.2500 ± 0.0015

$P(0.2515 > Z > 0.2485)$

$= \frac{0.2515 - 0.2508}{0.0005} > Z > \frac{0.2485 - 0.2508}{0.0005}$

$= 1.4 > Z > -4.6$

$= 0.9192$

(i) proportion of shaft in line with specification is 0.2485 to 0.2515

$\mu = 0.2508$ (original)

if $\mu = 0.2500$

$P(0.2485 < Z < 0.2515) = \frac{0.2485 - 0.2500}{0.0005} < Z < \frac{0.2515 - 0.2500}{0.0005}$

$= P(-3 < Z < 3)$

$= 0.9986 - (1 - 0.9986)$

$= 0.9972$

conclusion: It will get keep increasing