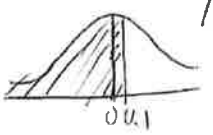
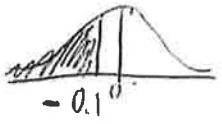
Tutorial Session 5 – Continuous Probability Distribution

Q7.76 Given $\mu = 0$, $\sigma = 1$

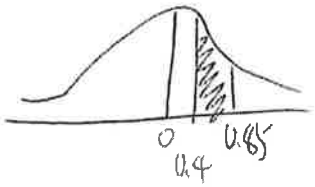
a) $P(z < 0.1) = 0.5398$



b) $P(z < -0.10) = 0.4602$

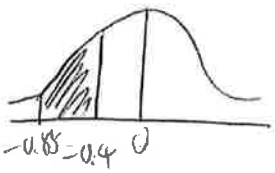


c) $P(0.4 < z < 0.85)$
$= P(z < 0.85) - P(z < 0.4)$
$= 0.8023 - 0.6554$
$= 0.1469$

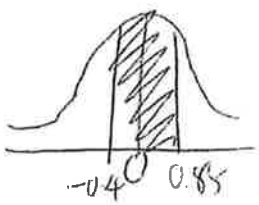


Q7.77 Given $\mu = 0$, $\sigma = 1$

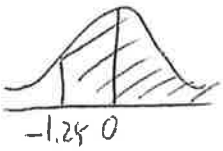
a) $P(-0.85 < z < -0.4)$
$= P(z < -0.4) - P(z < -0.85)$
$= 0.3446 - 0.1977$
$= 0.1469$



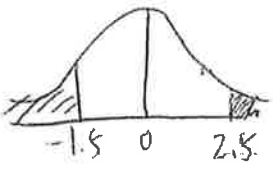
b) $P(-0.4 < z < 0.85)$
$= P(z < 0.85) - P(z < -0.4)$
$= 0.8023 - 0.3446$
$= 0.4577$



c) $P(z > -1.25)$
$= 1 - P(z < -1.25)$
$= 1 - 0.1056$
$= 0.8944$



d) $P(z < -1.5 \text{ or } z > 2.5)$
$= P(z < -1.5) + (1 - P(z < 2.5))$
$= 0.0668 + 0.0062$
$= 0.073$



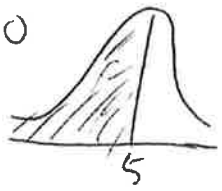
Q7.82 – Paint

Given $\mu = 5$, $\sigma = 0.2$

a). $P(x < 5.0)$ $\quad z = \frac{x-\mu}{\sigma} = \frac{5-5}{0.2} = 0$

$= P(z < 0)$

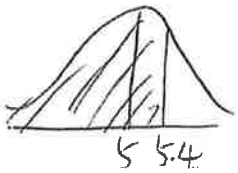
$= 0.5$



b). $P(x \leq 5.4)$ $\quad z = \frac{5.4-5}{0.2} = 2$

$= P(z \leq 2)$

$= 0.9772$



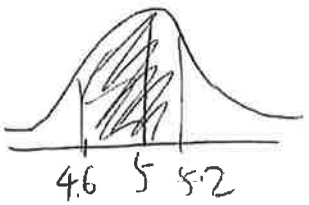
c). $P(x < 5.4) = P(x \leq 5.4) = 0.9772$

d). $P(4.6 < x < 5.2)$ $\quad z = \frac{5.2-5}{0.2} = 1$

$= P(-2 < z < 1)$ $\quad z = \frac{4.6-5}{0.2} = -2$

$= P(z < 1) - P(z < -2)$

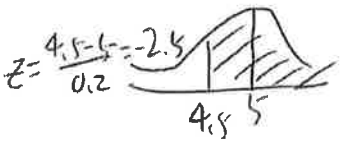
$= 0.8413 - 0.0228 = 0.8185$



e). $P(x > 4.5) = 1 - P(x \leq 4.5)$ $\quad z = \frac{4.5-5}{0.2} = -2.5$

$= 1 - 0.0062$

$= 0.9938$

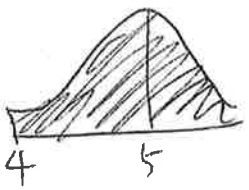


f). $P(x > 4.0) = 1 - P(x < 4.0)$ $\quad z = \frac{4-5}{0.2} = -5$

$= 1 - P(z < (-5))$

$= 1 - 0.000$

$= 1$



Q7.83 Birth Weight.

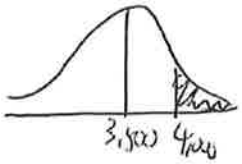
Given $\mu = 3,500$ g and $\sigma = 600$ g

a) $P(x > 4,000) = 1 - P(x < 4,000)$ $\quad z = \frac{4,000 - 3,500}{600} = 0.83$

$= 1 - P(z < 0.83)$

$= 1 - 0.7967$

$= 0.2033$



b) $P(3,000 < x < 4,000)$

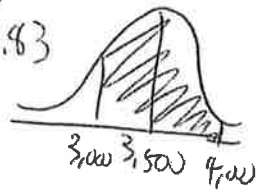
$= P(x < 4,000) - P(x < 3,000)$

$= 0.7967 - 0.2033$

$= 0.5934.$

$z = \frac{4,000 - 3,500}{600} = 0.83$

$z = \frac{3,000 - 3,500}{600} = -0.83$



c) $P(x < 2,000 \text{ or } x > 5,000)$

$= P(x < 2,000) + (1 - P(x < 5,000))$

$= P(z < -2.5) + (1 - P(z < 2.5))$

$= 0.0062 + (1 - 0.9938)$

$= 0.0062 + 0.0062$

$= 0.0124$

$z = \frac{2,000 - 3,500}{600} = -2.5$

$z = \frac{5,000 - 3,500}{600} = 2.5$