CABIE, LOWELL AUGUSTEEN G.
CMPSC 136
BSCS 2A

1) Given the normal distribution with mean = 200 and variance = 100, find:

$\mu = 200$

$\sigma^2 = 100 = \sqrt{100} = \sigma = 10$

a) the area below 214

$P(X < 214)$

$P\left(Z < \frac{214-200}{10}\right)$

$P(Z < 1.4)$

$= 0.9192$ or 91.92%

b) the area above 179

$P(X > 179)$

$P\left(Z > \frac{179-200}{10}\right)$

$P(Z > -2.1)$

$P(1 - 0.0179)$

$= 0.9821$ or 98.21%

c) the area between 188 and 206

$P(188 < X < 206)$

$P(188 < Z < 206)$

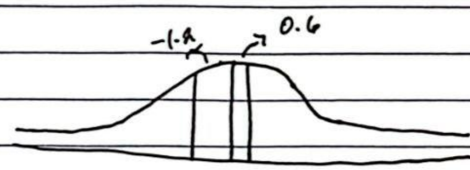
$P\left(\frac{188-200}{10} < Z < \frac{206-200}{10}\right)$

$P(-1.2 < Z < 0.6)$

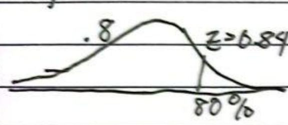
$P(Z < 0.6) - P(Z < -1.2)$

$0.7257 - 0.1151$

$= 0.61.06$ or 61.06%



d) $0.7795 = 0.84$

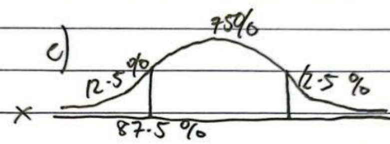


$x = z \cdot \sigma + \mu$

$x = 0.84(10) + 200$

$= 208.4$

e)



$12.5 = 0.125 = -1.15$

$87.5 = 0.8749 = 1.15$

x lower

$(-1.15)(10) + 200$

$x = 188.5$

x upper

$(1.15)(10) + 200$

$x = 211.5$

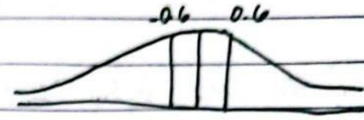
CABIE, LOWELL AUGUSTEEN G.
CMPSC 136

BSCS 2A

2) A softdrink machine is regulated so that it discharges an average of 200 mililiters per cup, if the amount of drink is normally distributed with a standard deviation of 15 mililiters;

$\mu = 200$

$\sigma = 15$



a) $P(X > 229)$

$P\left(z > \frac{229-200}{15}\right)$

$P(z > 1.6)$

$P(1 - .9452)$

$= 0.0548$ or 5.48%

b) $P(191 < X < 209)$

$P(191 < z < 209)$

$P\left(\frac{191-200}{15} < z < \frac{209-200}{15}\right)$

$P(-0.6 < z < 0.6)$

$P(z < 0.6) - P(z < -0.6)$

$.72457 - .2743$

$= 0.4514$ or 45.14%

c) $P(X > 230)$

$P(z > 230)$

$P\left(z > \frac{230-200}{15}\right)$

$P(z > 2)$

$P(1 - 0.9772)$

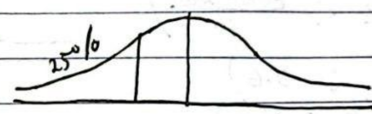
$= 0.0228$

out of 1000 cups:

1000×0.228

$= 22.8$ or approx 23 cups

d)



$0.25 = .25143 = -0.679$

$x = z\sigma + \mu$

$x = (-0.679)(15) + 200$

$= 189.89$ mL

CABIE, LOWELL AUGUSTEEN G. BSCS 2A
CMPSC 136

3. If a set of grades on a Statistics exam are approximately normally distributed with a mean of 74 and a standard deviation of 7.9, find

a) the lowest passing grade if the lowest 10% of the students are given F's;

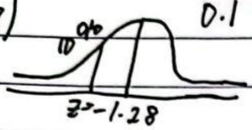
b) the highest B if the top 5% of the students are given A's;

c) the lowest B if the top 10% are given A's and the next 25% are given B's.

$\mu = 74$

$\sigma = 7.9$

a)



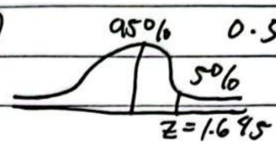
$0.1 = 0.1003 = -1.28$

$x = z\sigma + \mu$

$(-1.28)(7.9) + 74$

$= 63.89$ "Lowest Passing Grade."

b)



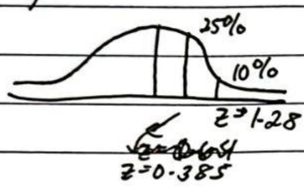
$0.5 = .9495 = 1.645$

$x = z\sigma + \mu$

$(1.645)(7.9) + 74$

$= 86.99$ "Highest B"

c)



$.10 = 0.8997 = 1.28$

$.25 = 0.6480 = 0.385$

10%: $z = 1.28$

$(1.28)(7.9) + 74$

$= 84.11$

25%: $z = 0.385$

$(0.385)(7.9) + 74$

$= 77.04$ "Lowest B."

CABIE, LOWELL AUGUSTEEN G. BSCS 2A
CMPSC 136

4. The IQs of 2,000 applicants to a certain university are approximately normally distributed with a mean of 115 and a standard deviation of 12. If the school requires an IQ of at least 95, how many of these students will be rejected on this basis, regardless of other qualifications?

9) $\mu = 115$
$\sigma = 12$

i) $P(X < 95)$
$P(z < 95)$
$P\left(z < \frac{95 - 115}{12}\right)$
$P(z < -1.67$
$= 0.0475$

2000×0.0475
$= 95$
95 students will be rejected based on their IQ.