#1

p(obtaining a female) $= \frac{45}{60} = \boxed{.75}$

p(obtaining a freshman) $= \frac{25}{60} = \boxed{.42}$

p(obtaining a male freshman) $= \frac{5}{60} = \boxed{.08}$

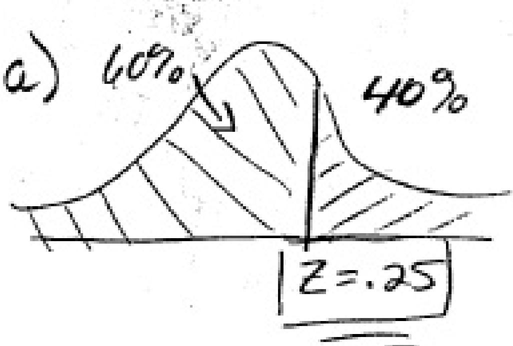
#2 Jar of 10 black marbles + 20 white marbles

p(white marble) $= \frac{20}{30} = \boxed{.67}$

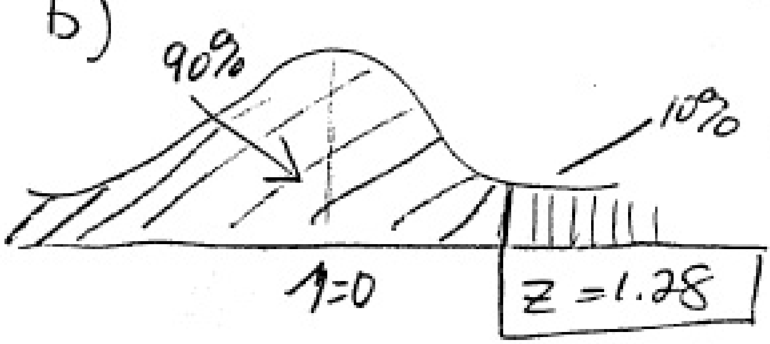
p(3rd marble of a random sample is black) $= \frac{10}{30} = \boxed{.33}$

#7 For a normal distribution:

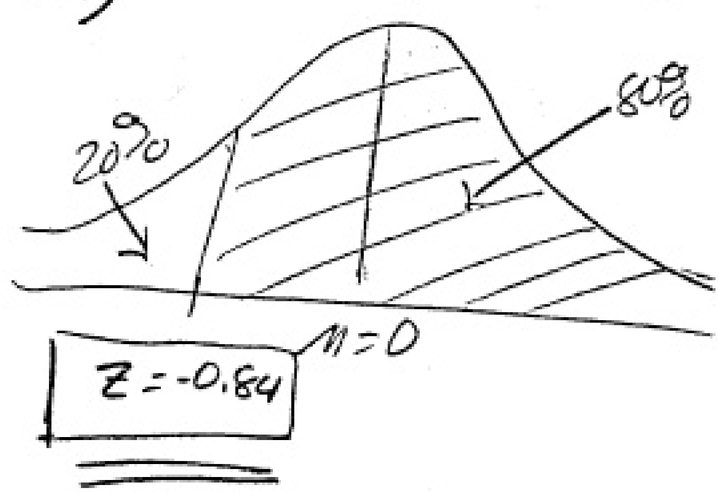
a)



b)



c)



#8 Normal distribution $\mu = 50$ $\sigma = 10$

a)

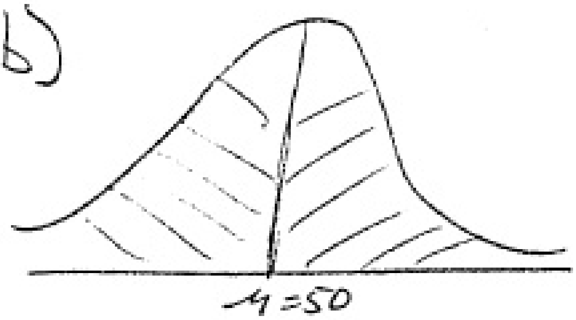
$Z = .50$

$$Z = \frac{X - \mu}{\sigma} = \frac{55 - 50}{10} = .50$$

$\therefore$ above(right) $= .3085$

left $= .6915$

b)



$X = 50$

$Z = 0$

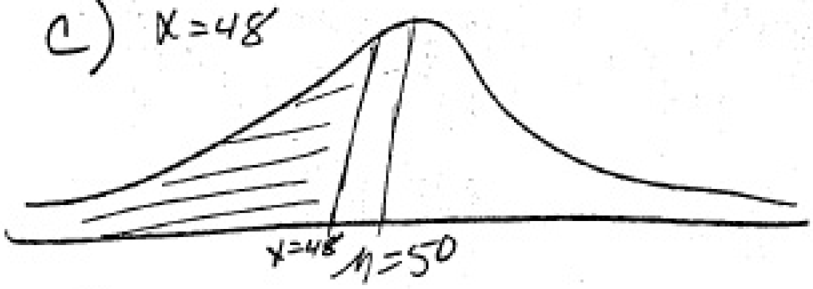
$Z = 0$

right $= .5000$

left $= .5000$

c) $X = 48$

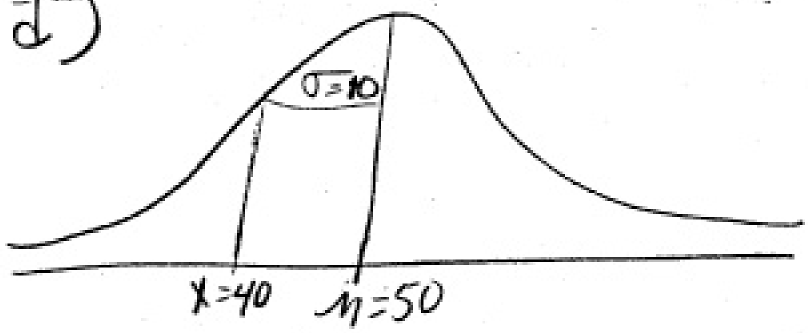
$$Z = \frac{X - \mu}{\sigma} = \frac{48 - 50}{10} = \frac{-2}{10} = -.02$$



left $= .4207$

Right $= .5793$

d)



$Z = -1.00$

$Z = -1.00$

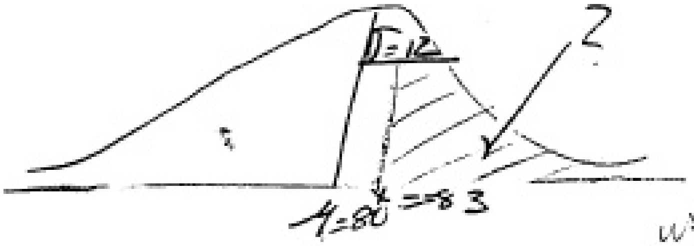
left $= .1587$

right $= .8413$

#12 normal distribution $\mu = 80$ $\sigma = 12$

a) $p(X \geq 83)$

$$Z = \frac{83-80}{12} = \frac{3}{12} = +.25$$



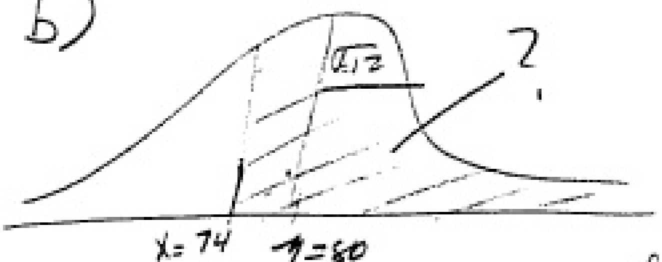
∴ area above (tail) = $\boxed{.4013}$

$p(X \geq 83) = .4013$

use col C

b)

$$Z = \frac{74-80}{12} = \frac{-6}{12} = -.50$$



∴ area above (body) = .6915

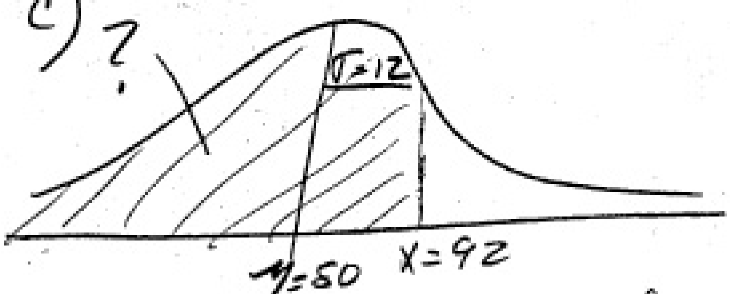
$p(X > 74)$

use col B

$p(X > 74) = \boxed{.6915}$

c)

$$Z = \frac{92-80}{12} = \frac{12}{12} = +1.00$$



∴ area below (away from tail) or the body

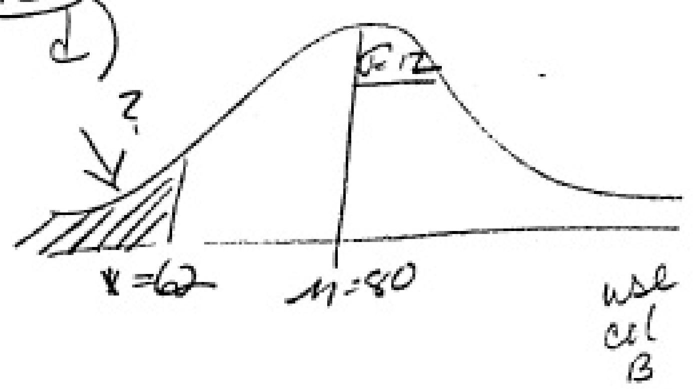
use col B

$p(X < 92)$

$= .8413$

$p(X < 92) = \boxed{.8413}$

#12 d)



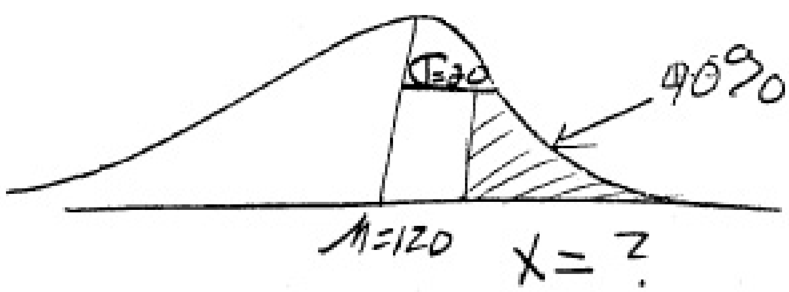
$$Z = \frac{62-80}{12} = \frac{-18}{12} = -1.5$$

area below (tail) = .0668

$\therefore p(x<62) = \boxed{.0668}$

14) Normal distribution $\mu = 120$ $\sigma = 20$

a) what score separates top 40% from the rest

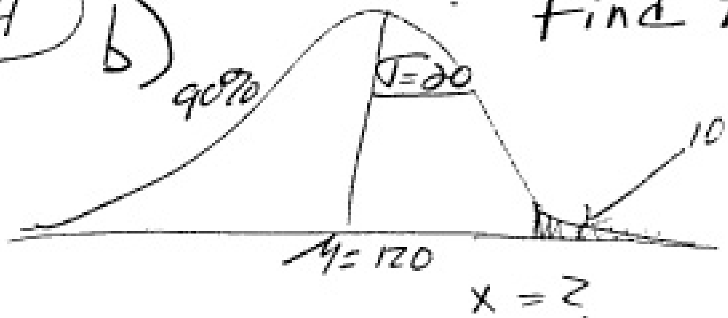


Find area of .4000 in table (tail - col C)

closest area is .4013 and corresponds with $z = +.25$

$\therefore X = \mu + z\sigma = 120 + (.25)(20)$
$= 125$

14 b)



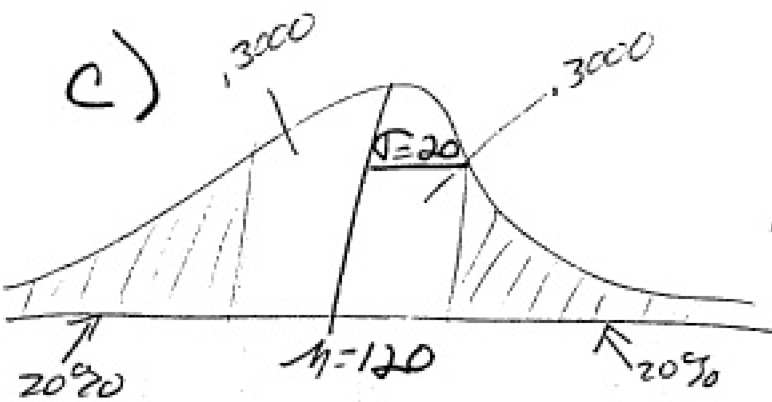
Find 90^{th} percentile

Find Z corresponding to area in tail of .10

Closest area is .1003 $\therefore$ $Z=+1.28$

$$X=\mu+Z\sigma \quad =120+(1.28)(20)$$
$$=\boxed{145.6}$$

c)



Find x scores that form middle 60% of distribution.

30% to either side of the mean (symetrical)

Area above score (tail) must be .2000

$\therefore$ $Z=+.84$ and by symetry lower value of $Z=-.84$

$X=\mu+Z\sigma$
$=120+(.84)(20)$
$120+16.8$
$=136.8$

And

$=120+(-.84)(20)$
$=120-16.8$
$=103.2$

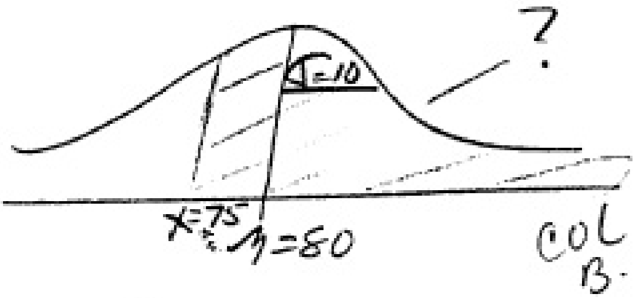
$103.2<X<136.8$

Normal dist. $\mu = 80$ $\sigma = 10$

16

a) $p(x > 75) = ?$

$Z = \frac{75-80}{10} = \frac{-5}{10} = -.5$

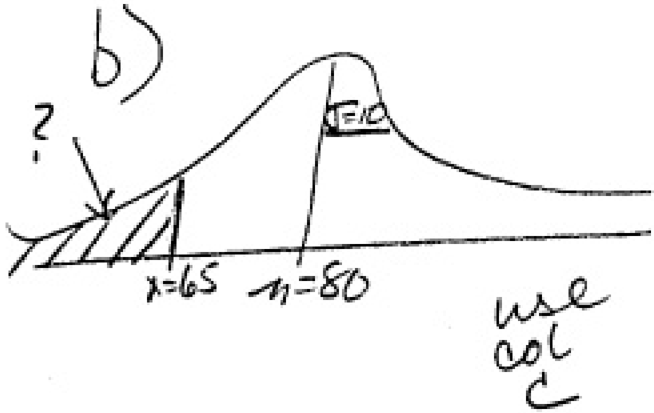


area above (body) $= .6915$

$p(x > 75) = \boxed{.6915}$

b)

$Z = \frac{65-80}{10} = \frac{-15}{10} = -1.5$

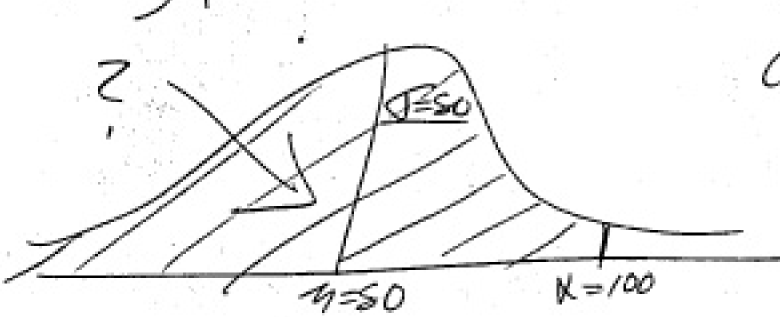


area below (tail) $= .0668$

$\therefore\ p(x < 65) = \boxed{.0668}$

c) $p(x < 100) = ?$

$Z = \frac{100-80}{10} = \frac{20}{10} = +2.00$



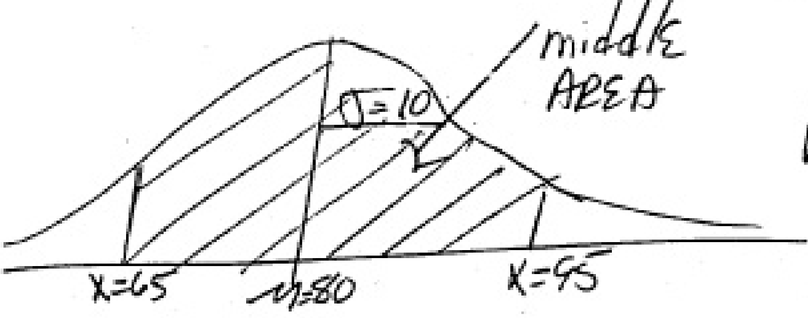
area below $Z = +2.00$ (body) $= .9772$

$p(x < 100) = \boxed{.9772}$

d) $p(65 < x < 95)$

$Z = \frac{65-80}{10}$ and $Z = \frac{95-80}{10}$

$= \frac{-15}{10} = -1.5$ and $= \frac{15}{10} = +1.5$



Find area in tails + subtract from 1.00

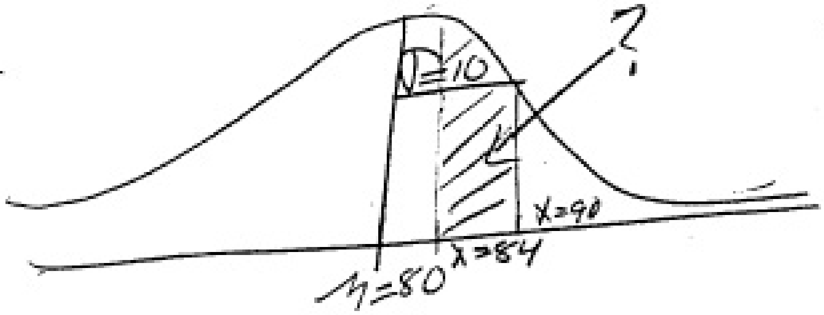
$.0668 + .0668$

16 cont

d) $1.000 - .0668 - .0668 = .8664$

$\therefore p(65 < X < 95) = \boxed{.8664}$

e) $p(84 < X < 90)$ $Z = \frac{84-80}{10} = \frac{4}{10} = +.40$ $Z = \frac{90-80}{10} = +1.00$



Find area in tail $= .3446$

Find area in tail $= .1587$

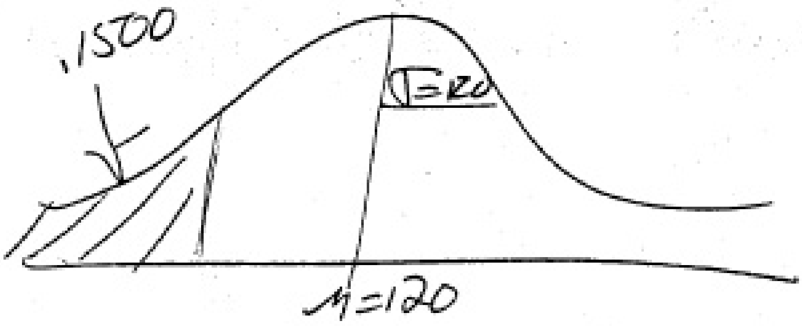
$.3446 - .1587 = .1859$

$\therefore p(84 < X < 90) = \boxed{.1859}$

18 $\mu = 120$ $\sigma = 15$

a) 15^{Th} percentile

look up in Z-table
closest area = .1492
Corresp. $Z = -1.04$



$\therefore$ Score$(x) = \mu + Z\sigma$
$= 120 + (-1.04)(15)$
$= \boxed{104.4}$

$Z = -1.04$

18 cont

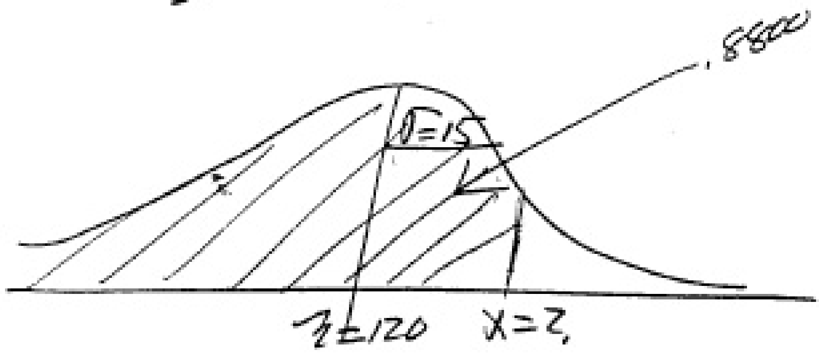
b) 88^{th} percentile

look up area of .8800 in body closest area is .8810

$\therefore Z = 1.18$

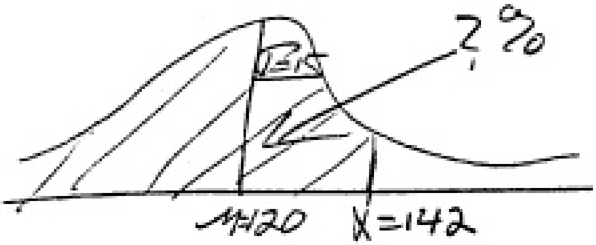
$\therefore$ Score(x) = $120 + (1.18)(15)$

$= \boxed{137.7}$



c) Percentile Rank for X=142

$Z = \frac{142-120}{15} = \frac{22}{15} = 1.47$



Z=? use col B

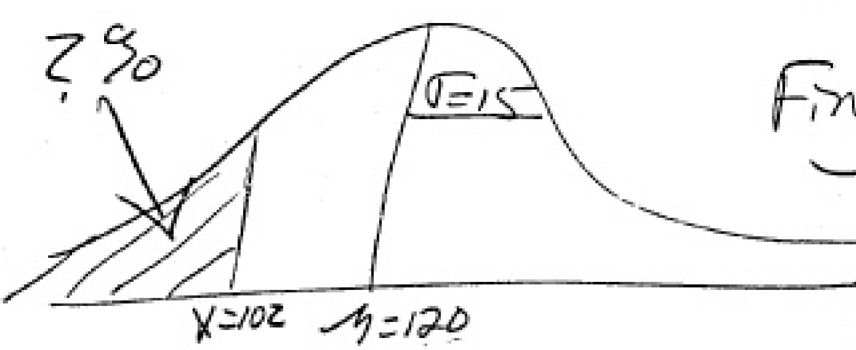
Find area in body for Z of 1.47

area = .9292

$\therefore$ Percentile Rank = $\boxed{92.92\%}$

d) X=102 % Rank=?

$Z = \frac{102-120}{15} = \frac{-18}{15} = -1.2$



Find area in tail for Z = -1.2

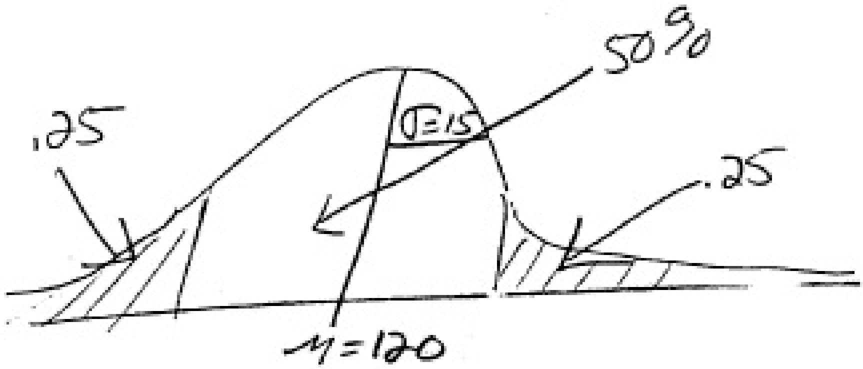
area = .1151

$\therefore$ % Rank = $\boxed{11.51\%}$

18 cont

e) % Rank for x = 120 at the mean
∴ % Rank = 50%
$z = 0$

f) Semi-interquartile Range $= \frac{Q3-Q1}{2}$
$Q3 = 75\%$
$Q1 = 25\%$



find z for area in tail of .2500
Closest area .2514
$z = .67$

∴ score(Q3)
$= \mu + z\sigma$
$= 120 + (.67)(15)$
$= \boxed{130.05}$

Now find Q1

score(Q1) $= \mu + z(\sigma)$
$= 120 + (-.67)(15)$
$= 109.95$

Semi-interquartile Range $= \frac{Q3-Q1}{2}$
$= \frac{130.05 - 109.95}{2}$
$= \boxed{10.05 \text{ points}}$