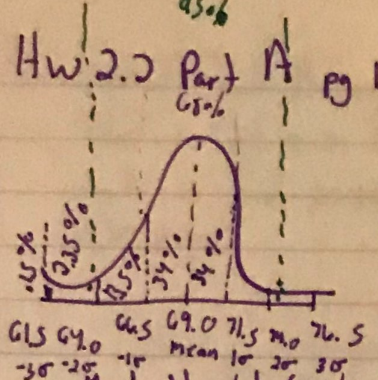
Hw 2.2 Part A pg 131-132 41, 43, 45, 47, 49, 51

(41)



Men's Height (inches)

(43) a) 95% fall between -2σ and 2σ

percent taller than 74in

$100 - 95 = \frac{5\%}{2} = 2.5\%$

$\boxed{\text{approximately } 2.5\%}$

b) $\boxed{64.0 \text{ and } 74.0 \text{ inches}}$

c) between 64 and 66.5 inches

$\frac{95\% - 68\%}{2} = \frac{27\%}{2} = \boxed{13.5\%}$

d) Height of 71.5 has 84% of heights below it

$\boxed{\text{84th percentile}}$

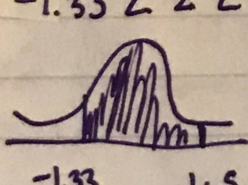
(45) The standard deviation is approximately 0.2 for the tall red curve.
The standard deviation is approximately 0.5 for the short purple curve.

(47) a) $z < 2.85 = \boxed{.9978}$ b) $z > 2.85$ $1 - .9978 = \boxed{.0022}$

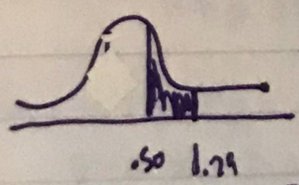
c) $z > -1.66 = 1 - .0485 = \boxed{.9515}$

d) $-1.66 < z < 2.85 = .9978 - .0485 = \boxed{.9493}$

(49) a) $-1.33 < z < 1.65 = .9505 - .0918 = \boxed{.8587}$



b)

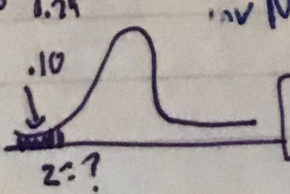


$.50 < z < 1.79$

$.9633 - .6915 = \boxed{.2718}$

invNorm(.10, 0, 1)

(51) a) 10th percentile

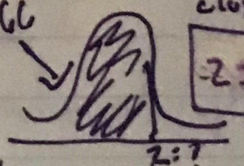


.1003

$\boxed{z \approx -1.28}$

invNorm(.66)

.6591 closest



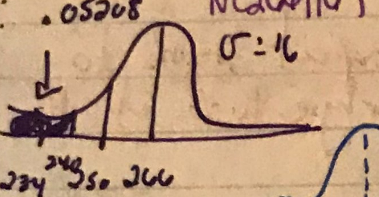
$\boxed{z \approx .41}$

b) 34% observations greater is at 66th percentile

HW 2.2 Part B pages 132+133 prob 53, 55, 57, 59

53) a) State: Let x = length of pregnancies. X has N(266, 16).
want to find percentile is a pregnancy that lasts 240 days.

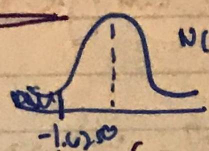
Plan: .05208 N(266,16) $\sigma = 16$



Do: x = 240

Normalcdf(-1000, 240, 266, 16) = .05208

Area under curve = .05208.

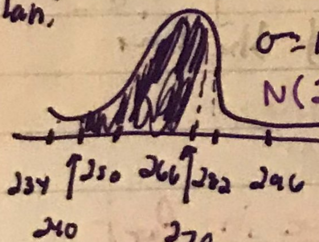


$z_{240} = \frac{240-266}{16} = -1.625 \approx -1.63$ $z < -1.63 = .0516$

Conclude: About 5.2% of pregnancies lasts less than 240 days.

b) want % of pregnancies that last between 240 + 270 days

Plan:

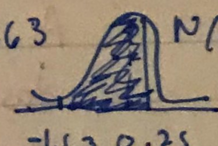


$\sigma = 16$
N(266,16)

Do: Normalcdf(240, 270, 266, 16)
area under curve = .5466

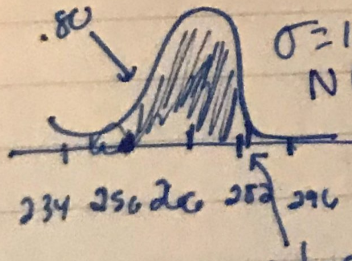
Conclude: About 55% last between 240+270 days.

$z_{270} = \frac{270-266}{16} = \frac{4}{16} = .25$ $z_{240} = \frac{240-266}{16} = \frac{-26}{16} = -1.625 \approx -1.63$



$z < .25 = .5987$
$z < -1.63 = .0516$
$-1.63 < z < .25 = .5471$

c) How long do longest 20% last?
Plan: Need to find 80th percentile to find longest 20%



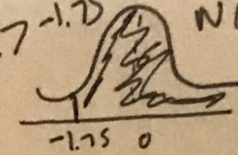
$\sigma = 16$
N(266,16)

InvNorm(.80, 266, 16) = 279.4659

Conclude: Longest 20% last about 279.47 days. (or 279.44 days)
calculator answer table answer

proportion closest to .80 is .7995 which corresponds with z value of .84

$.84 = \frac{X - 266}{16}$ $x = \underline{279.44}$



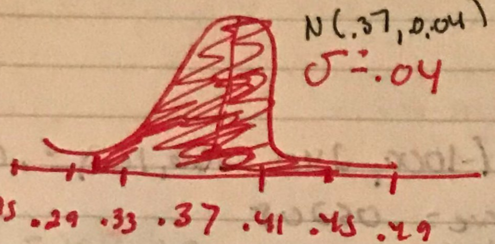
$z_{.30} = \frac{.30-.37}{0.04} = \frac{-.07}{.04} = -1.75$

$z < -1.75 = .0401$

55) N(.37, 0.04)

a) $x > .30$

$z > -1.75 = 1 - .0401 = .9599$



Norm CDF (.30, 1000, .37, 0.04) = .9599

We would expect trains to arrive on time 96% of the time.

b) N(.37, 0.04)

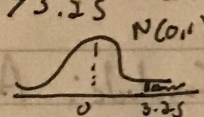
$x > 0.50$

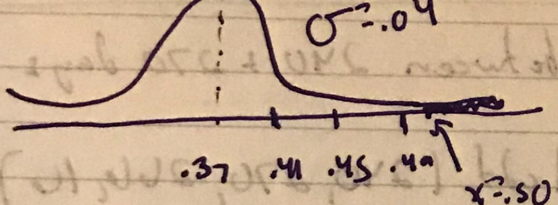
$z_{0.50} = \frac{.50-.37}{.04} = \frac{.13}{.04} = 3.25$

$z > 3.25$

$z < 3.25 = .9994$

$z > 3.25 = 1 - .9994 = .0006$





Norm CDF (.50, 1000, .37, 0.04) = .000577 = .06%

We would expect the train to arrive too early about .06% of the time.

c) It would make sense to try have the value in Part A be larger. We want the train to arrive at its destination on time, but not to arrive at the switch point early.