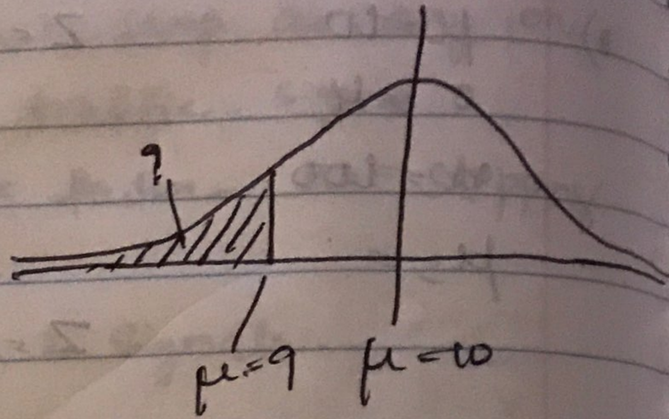
1) $\mu_{pop} = 10$

$\sigma = 4$

$n = 100$

$\sigma_s = \sigma / \sqrt{n} = \frac{4}{\sqrt{100}} = 0.4$



$$Z = \frac{x - \mu}{\sigma_1}$$

$$= \frac{9 - 10}{0.4}$$

$$= -1/0.4 = -2.5$$

$$= 0.0062$$

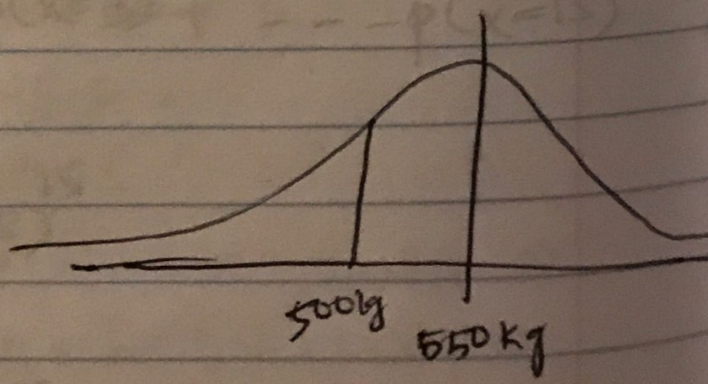
probability $= 0.62\%$

2) $\mu_{pop} = 50$ kgs

$\sigma_{pop} = 15$

$n = 10$ = sample size

Max weight = 550 kg



μ of sample 10 = 50×10

= 500 kgs

$$= \frac{550-500}{\frac{150}{\sqrt{10}}}$$

$$Z = \frac{50}{4.74} = 10.548 \simeq 10.55$$

~~lets~~ let's say $\sigma_{pop} = 150$

$$\cancel{\frac{150}{4.74}} =$$

$$= \frac{150}{\sqrt{10}} = 47.43 = \frac{50}{47.43}$$

$$= \cancel{\frac{50}{43}}$$

1.05

$= 0.8531$

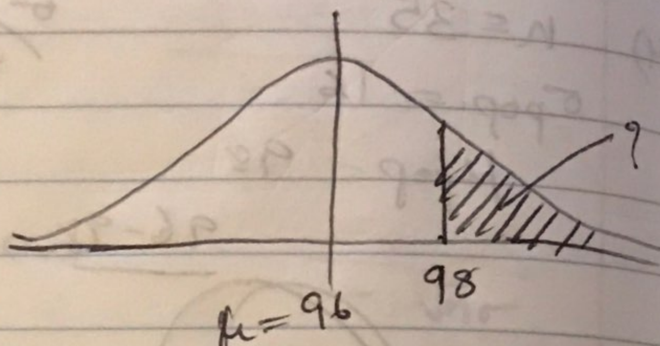
$= 85.31\%$

4) $n = 35$

$\mu = 96$

$x = 98$

$\sigma = 16$



$$Z = \frac{x - \mu}{\sigma/\sqrt{n}} = \frac{98 - 96}{16/\sqrt{35}} = \frac{2}{2.7044} = \cancel{0.7396}$$

$= 0.74$

$= 0.7704$

$= 1 - 0.7704$

$= 0.2296$

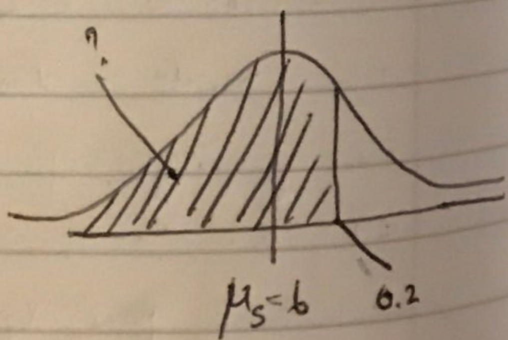
$= 22.96\%$

5) $\mu_{pop} = 6$

$\sigma_{pop} = 1$

a) $\mu_{pop} = \mu_{sample} = 6$

$n = 1$ (given)



$$Z = \frac{x - \mu}{\frac{\sigma}{\sqrt{n}}} = \frac{6.2 - 6}{1}$$

$Z = 0.2$

$= 0.5793$

$= 57.93\%$

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b) $n = 100$

$\mu_{pop} = \mu_s = 6$

$\sigma_{pop} = \cancel{\sigma}\ 1$

$\sigma_{sample} = \frac{\sigma_{pop}}{\sqrt{n}} = \frac{1}{\sqrt{100}} = 0.1$

$$Z = \frac{X - \mu}{\sigma/\sqrt{n}} = \frac{0.2}{0.1} = 2$$

$Z = 2$

prob $= 0.9772$

$= 97.72\%$

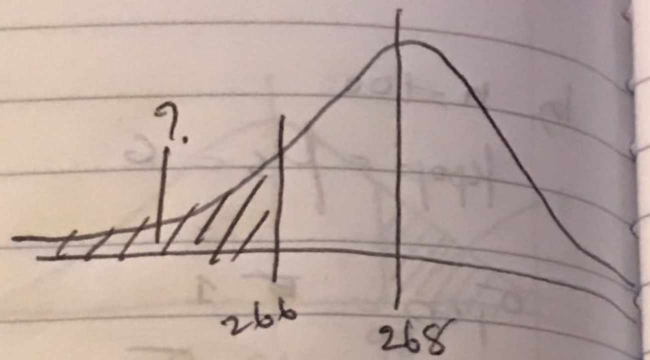
6) If the company produces all helmets with head breadth less than 6.2 inch, then they would fit only few men but not all, because the sample size the company selected to decide the breadth is not enough to generalise. They should come up with more samples with increased (or) different sample sizes (or)

7) $\mu_{pop} = 268$ days

$\sigma_{pop} = 15$ days

$n = 25$

$\mu_{pop} = \mu_{sample} = 268$



$$Z = \frac{x - \mu}{\sigma/\sqrt{n}} = \frac{260 - 268}{15/\sqrt{25}} = -8/3 = 2.67$$

$= 0.0038$

$= 0.38\%$

8) If in Question no. 7, 25 women that are selected are put on diet (which is not mentioned in Q7)

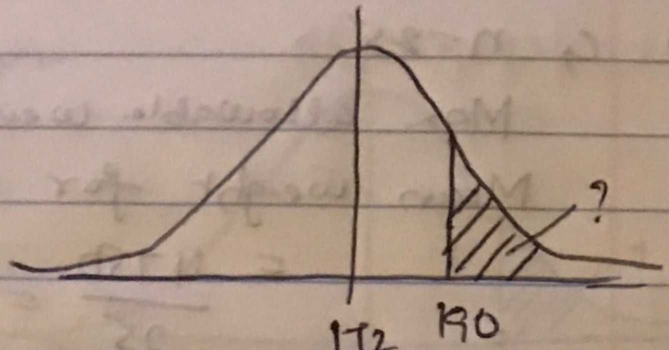
(or)

if it is mentioned that 25 woman ~~are~~ that are selected are on a diet then we can say that ~~diet~~ length of pregnancy is not affected by the diet because the probability of mean length of pregnancy less than 260 days is very less (0.38%).

Since it is not mentioned that those 25 women are put on a diet, it ~~is~~ cannot be said that diet has significant effect on the length of pregnancy

9) $\mu_{pop} = 172$ lbs

$\sigma_{pop} = 29$ lbs



a) $n = 1$

$\mu_{pop} = \mu_{sample} = 172$ lbs

$$Z = \frac{x - \mu}{\sigma/\sqrt{n}} = \frac{190-172}{29} = 0.62 = 0.7324$$

$= 1 - 0.7324$

$= 0.2676$

prob $= 26.76\%$

b) $n = 25$

$$= \frac{190-172}{29/\sqrt{25}} = \frac{18}{5.8} = 3.1$$

$= 0.9991$

$= 1 - 0.9990$

$= 0.001$

prob $= 0.1\%$

c) $n = 25$

$$= \frac{4750 - 172}{5.8} =$$

$= 4750$ is the max allowable weight

Mean w

c) $n = 25$

Max allowable weight = 4750 lbs

Mean weight for this sample $n = 25$

$$= \frac{4750}{25} = 190$$

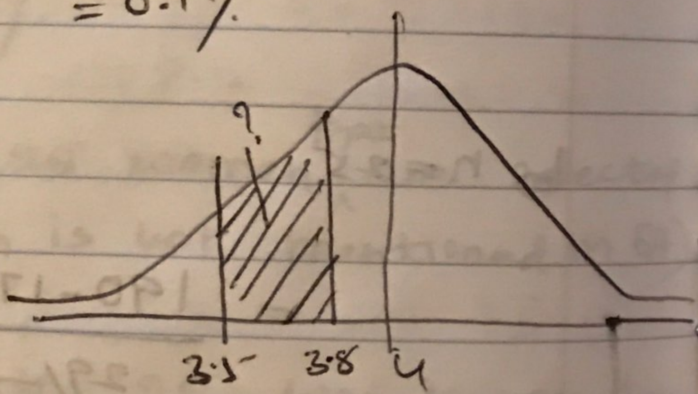
$$\frac{190 - 172}{29/\sqrt{25}} = \frac{18}{5.8} = 3.1$$

$= 0.9990$

$= 1 - 0.9990$

$= 0.001$

prob $= 0.1\%$



10) $\mu_{pop} = 4$ gms

$\sigma_{pop} = 1.5$ gms

$n = 50$

i) $X = 3.5$

$$Z = \frac{3.5 - 4}{\frac{1.5}{\sqrt{50}}}$$

$$= \frac{-0.5}{1.5/5\sqrt{2}}$$

$$= \frac{-0.5}{0.2}$$

$Z = -2.5 \Rightarrow p = \cancel{0.9938}$ 0.0062

(ii) $X = 3.8$

$$Z = \frac{-0.2}{0.2}$$

$= -1$

$P = 0.1587$

between 3.5g & 3.8g

$= 0.1587 - 0.0062$

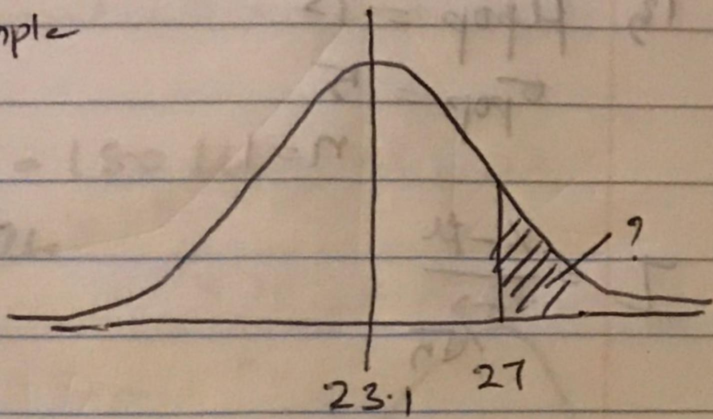
$= 0.1525$

$= 15.25\%$

11) $\mu_{pop} = 23.1\text{yrs} = \mu_{sample}$

$\sigma_{pop} = 3.1\text{yrs}$

$n = 6$



$$Z = \frac{X - \mu}{\sigma/\sqrt{n}}$$

$$= \frac{27 - 23.1}{3.1/\sqrt{6}} = \frac{3.9}{1.27} = 3.07$$

$\text{prob} = 0.9989 = 1 - 0.9989$

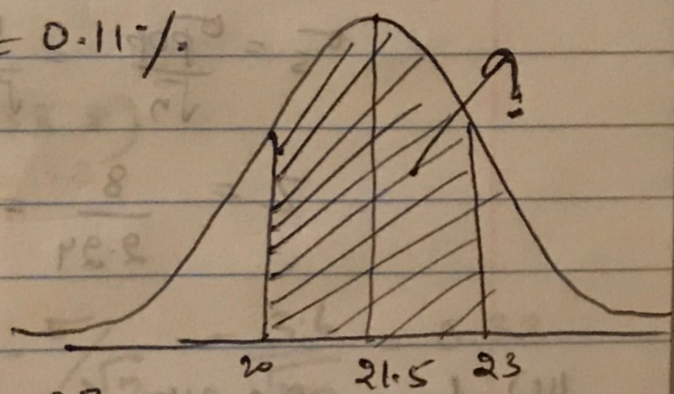
$= 0.0011$

$= 0.11\%$

12) $\mu_{pop} = 21.5$

$\sigma_{pop} = 2.22$

$n = 8$



i) $X = 20$

$$= \frac{20 - 21.5}{\frac{2.22}{\sqrt{8}}}$$

$$= \frac{-1.5}{0.78}$$

$Z = -1.92$

$\text{Prob} = 0.0274$

ii) $X = 23$

$$= \frac{23 - 21.5}{0.78}$$

$$= \frac{1.5}{0.78}$$

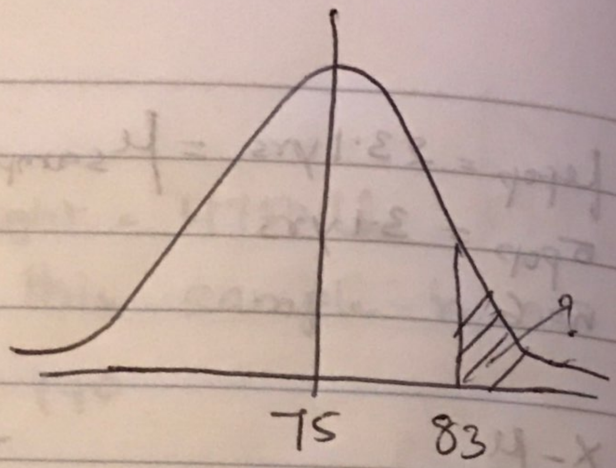
$Z = 1.92$

$\text{prob} = 0.9726$

$= 0.9726 - 0.0274$

$= 0.9452 = 94.52\%$

13) $\mu_{pop} = 75$
$\sigma_{pop} = 5$
$n = 1$



$$Z = \frac{x-\mu}{\sigma/\sqrt{n}}$$

$$= \frac{83-75}{5} = 1.6$$

$= 0.9452$

prob $= 1 - 0.9452$

$= 0.0548$

$= 5.48\%$

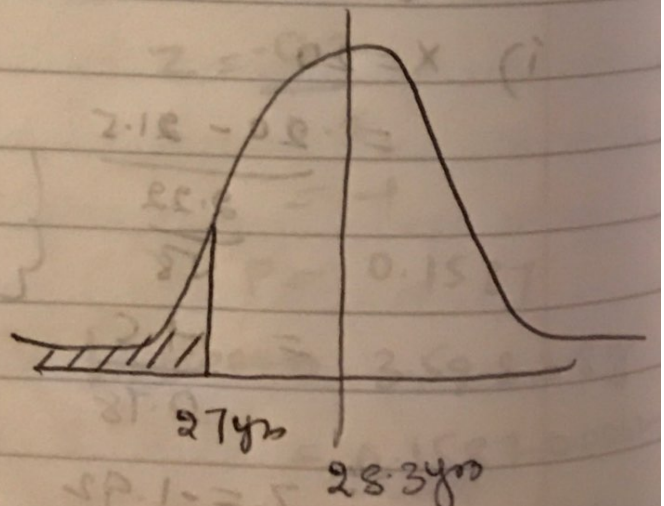
b) $n = 5$

$$\sigma_s = \frac{\sigma_{pop}}{\sqrt{n}} = \frac{5}{\sqrt{5}} = 2.24$$

$$Z = \frac{8}{2.24} = 3.57$$

14) $\mu_{pop} = 28.3$ yrs
$\sigma_{pop} = 2.3$ yrs

$n = 10$



$$Z = \frac{27 - 28.3}{\frac{2.3}{\sqrt{10}}} \quad \frac{-1.3}{=0.73}$$

$= -1.78$

$= 0.0375$

Prob $= 3.75\%$

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