

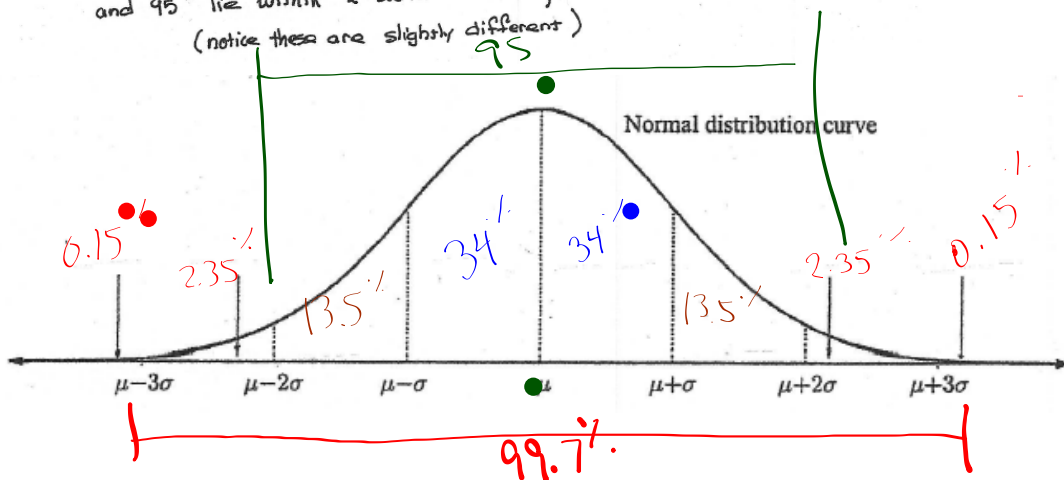
Write on the board
to let me know about
HW questions

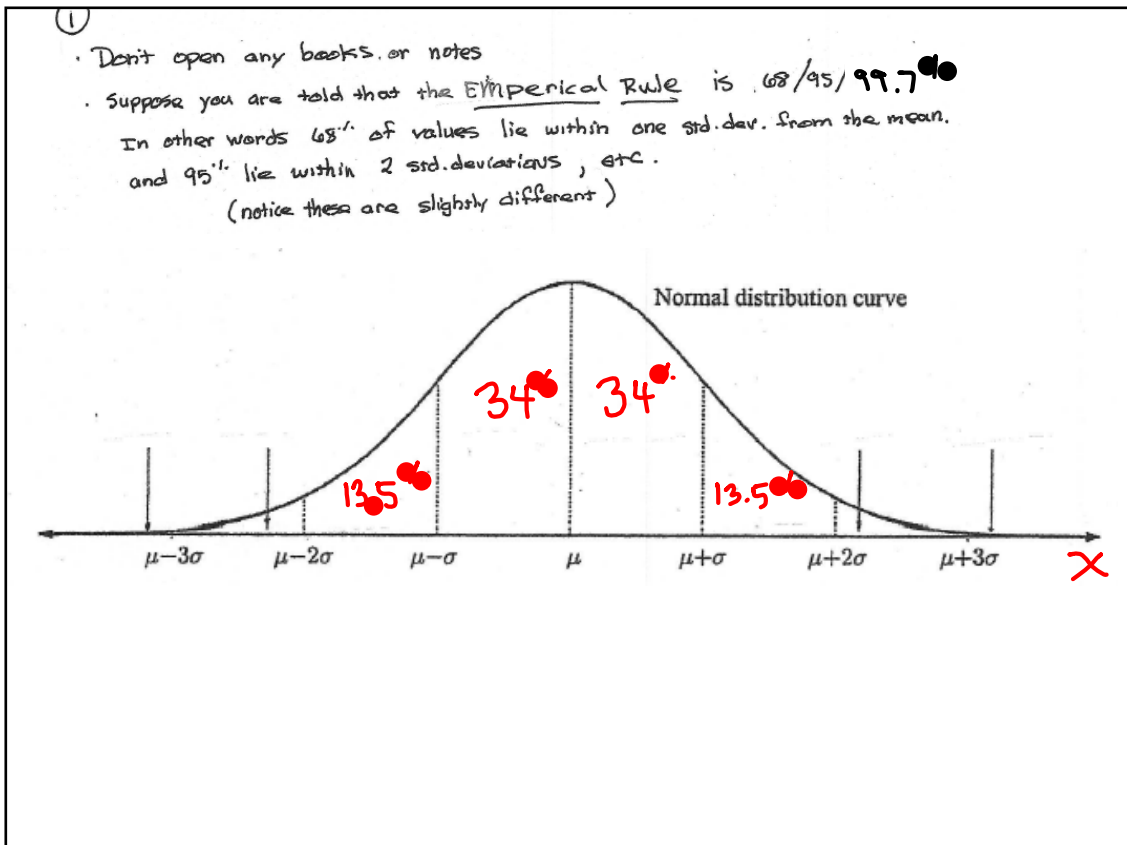
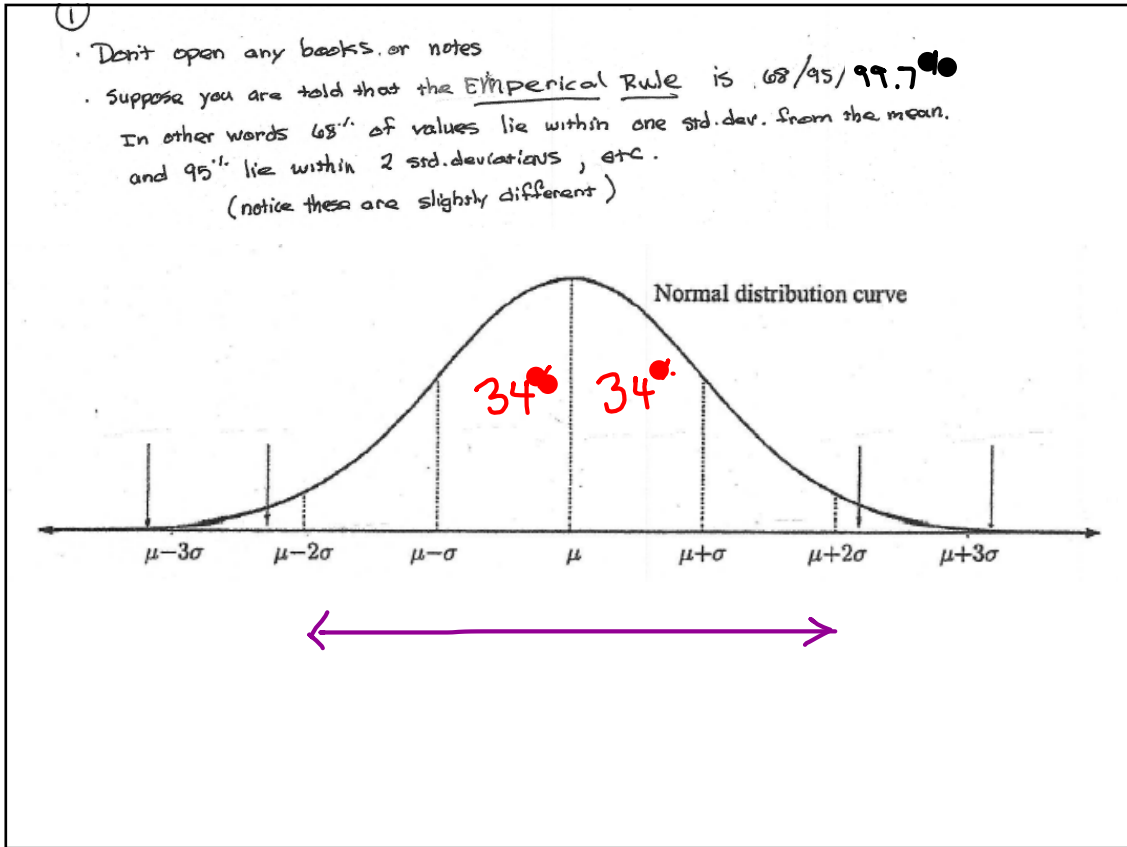


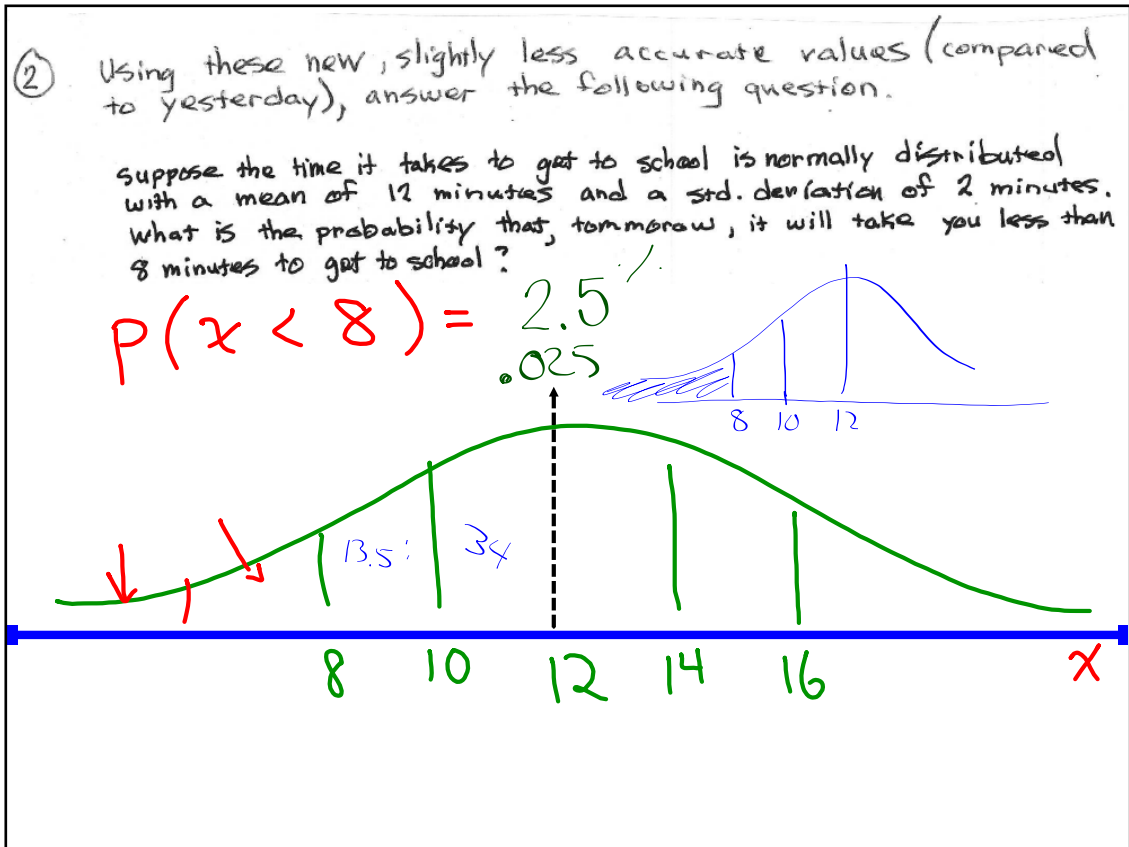
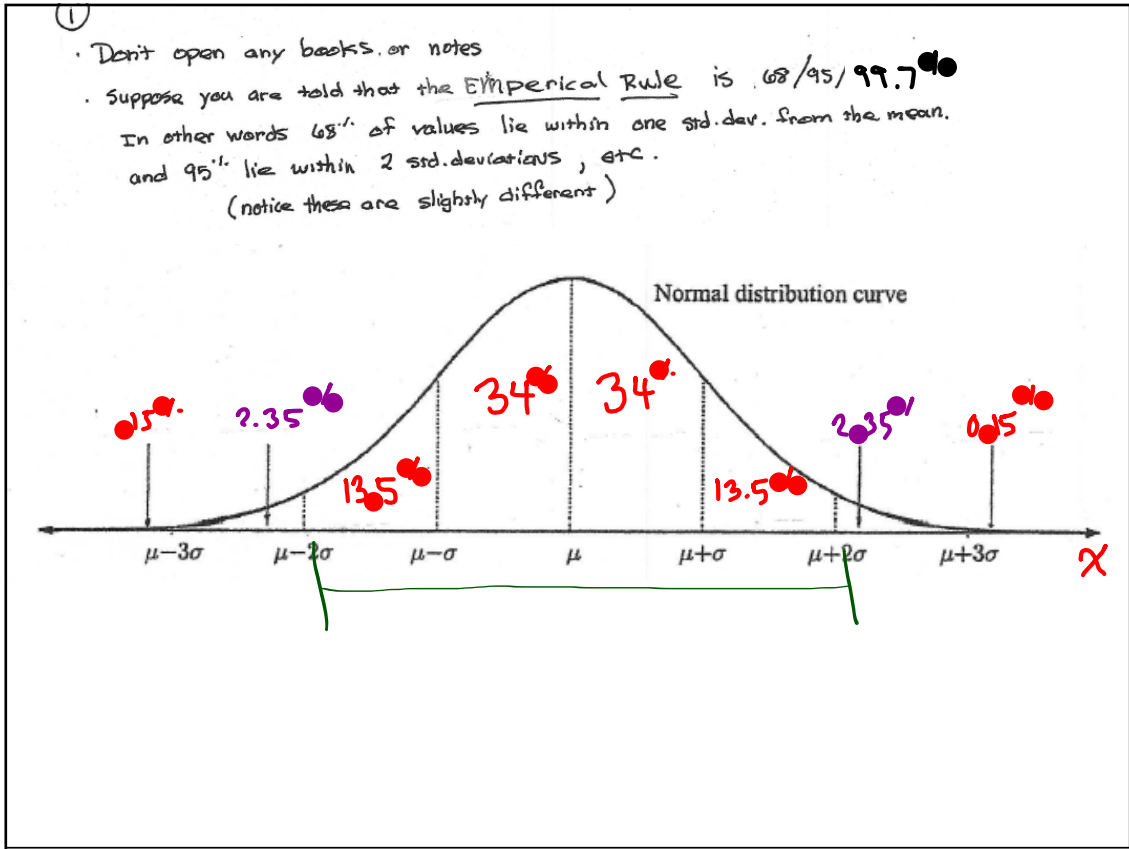
Pick up the Warm Up
and the Ch. 10 packet

①

- Don't open any books or notes
 - Suppose you are told that the Empirical Rule is 68/95/99.7%
- In other words 68% of values lie within one std. dev. from the mean,
and 95% lie within 2 std. deviations, etc.
(notice these are slightly different)



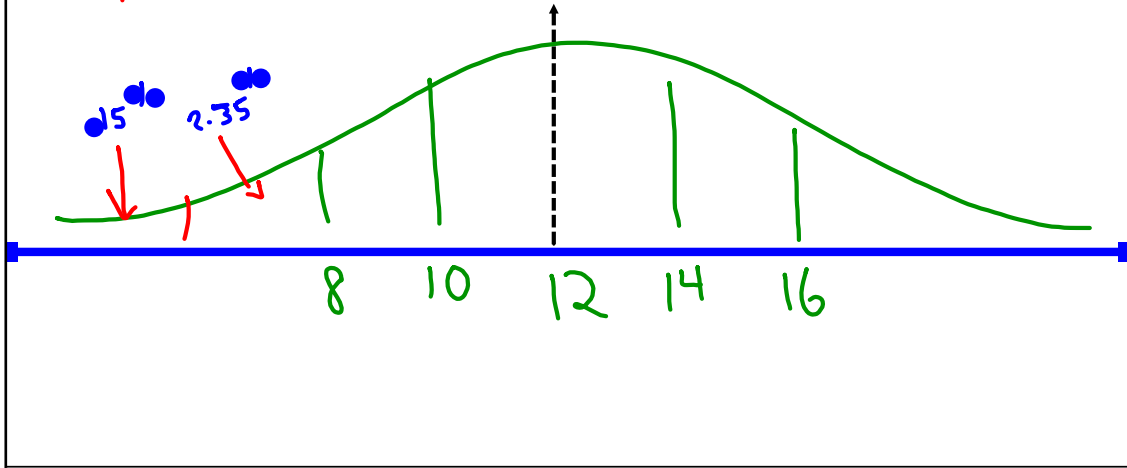




② Using these new, slightly less accurate values (compared to yesterday), answer the following question.

suppose the time it takes to get to school is normally distributed with a mean of 12 minutes and a std. deviation of 2 minutes. What is the probability that, tomorrow, it will take you less than 8 minutes to get to school?

$$P(X < 8) = 2.35\% + 0.15\% = 2.50\%$$



③ Notation: If a continuous random variable, like time in the example above, is normally distributed with a mean μ and standard deviation σ we write

$$\mu = 16$$

$$\sigma = 3$$

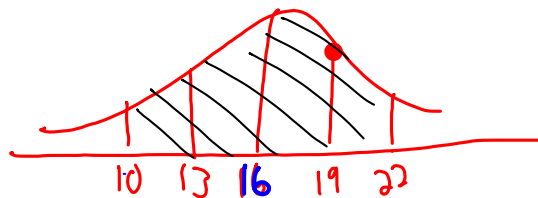
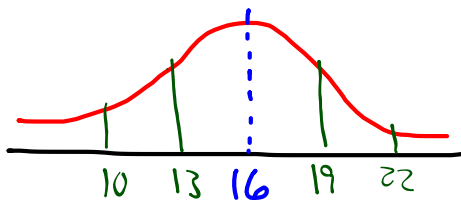
$$X \sim N(\mu, \sigma^2)$$

σ^2 is the square of std deviation which is the variance.

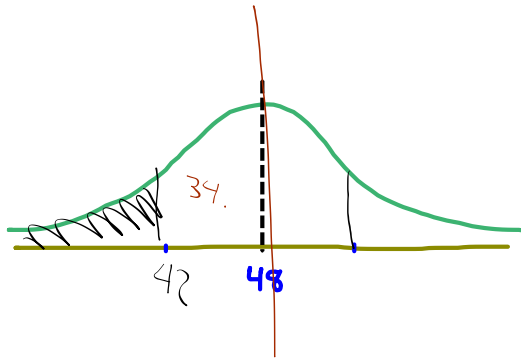
④ Suppose $X \sim (16, 3^2)$, what is

$$P(10 < X < 22) ?$$

$$= 95\%$$



- 5 The mean average rainfall of Claudona for August is 48 mm with a standard deviation of 6 mm. Over a 20 year period, how many times would you expect there to be less than 42 mm of rainfall during August in Claudona?



$$P(X < 42) = 16\%$$

Check
HW

and record on
new sheet

$100\% + 1.9\% = 101.9\%$
 1.019

Problem #1 : In 1989, the population of India was 835 million people. The annual growth rate was 1.9%. Use this information to predict the population in 1990, 1991, and 1992.

in 1990 $835,000,000(1.019) = 850,865,000$ people

in 1991 $867,031,475$ people

1992 $883,505,032$ people

#2 : Write an exponential function to model India's growth. Use it to estimate India's population in 2001

2001 in 12 years $y = (835,000,000)(1.019)^x$ if $x=12$
 $y = 1,046,590,248$ people

CONTINUE ON BACK

Problem #3 : A typical car depreciates about 20% a year once purchased. Hopefully my Subaru's is only 10%!

Suppose a \$19,000 car loses $\frac{1}{5}$ of its value every year. What is its value after 5 years?

$\frac{1}{5}$ is $\frac{20}{100}$

$100\% - 20\% = 80\%$

Try to write an exponential function to help you answer this question.

$f(x) = \frac{19000(0.8)^t}{}$ = $19000(0.8)^5$
= $96,275.42$

④ $f(x) = -a^{-x} + 1.25 = -\frac{1}{a^x} + 1.25$

Consider the function $f(x) = -a^{-x} + 1.25$, where a is a positive constant and $x \geq 0$. The diagram shows a sketch of the graph of f . The graph intersects the y -axis at point A and line L is its horizontal asymptote.

(a) Find the y -coordinate of A. $f(0) = -a^{-0} + 1.25 = -1 + 1.25 = 0.25$ (2)

The point $(2, 1)$ lies on the graph of $y = f(x)$. $1 = -a^{-2} + 1.25$

(b) Calculate the value of a . $1 - 1.25 = -\frac{1}{a^2} + 1.25 - 1.25$
 $-0.25 = -\frac{1}{a^2}$ (2)

(c) Write down the equation of L . $-\frac{0.25}{1} = \frac{1}{a^2}$
 cross multiply and solve
 $a^2 = \frac{1}{0.25}$
 $a = \sqrt{4} = 2$ (2)

$f(x) = -2^{-x} + 1.25$

$y = 1.25$
 asymptote

⑤ The graph of the quadratic function $f(x) = 3 + 4x - x^2$ intersects the y -axis at point A and has its vertex at point B. $f(x) = 3 + 4x - x^2$

$0 = 4x - x^2$
 $0 = x(4 - x)$
 $x = 0$ or $4 - x = 0$
 $x = 4$

$a = -1$
 $b = 4$
 $c = 3$

(a) Find the coordinates of B. $x = \frac{-b}{2a} = \frac{-4}{2(-1)} = 2$
 $(2, 7)$ with GDC (3)

Another point, C, which lies on the graph of $y = f(x)$ has the same y -coordinate as A. C has a x -value of 4 since the y -intercept at point A is 3

(b) (i) Plot and label C on the graph above. (4, 3)
 (ii) Find the x -coordinate of C. (4, 3) (3)

6

$f(x) = x^2 - 6x + 8 = (x-4)(x-2)$ ✓

Factorise the following Quadratic, $f(x) = x^2 - 6x + 8$

Plot it on the axes below for the domain $0 \leq x \leq 6$ label with the coordinates, the zeros, the y-intercepts and the vertex. Mark on the axis of symmetry and label it with the equation of the line. State the corresponding range of the function.

Where is the vertex of the function $f(x) = (x-5)^2 + 6$?

(5, 6)

(Total 6 marks)

7

a. Given $f(x) = k \times 2^x$ and $f(2) = 24$, what is the value of k ?

$24 = k \cdot 2^2$
 $24 = 4k$
 $k = 6$

b. Given $g(x) = 2^{(x+1)} - 1$, what is the equation of the asymptote and the coordinates of the y-intercept?

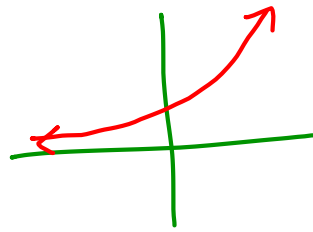
$y = -1$
y-intercept (0, 1)

c. If the diameter of a tree is given by $d = 3.5 \times 2.4^{0.1t}$, where t is the number of years after planting, find

a) The diameter of the tree when it was planted

when $t = 0$ $3.5(2.4)^{0.1(0)} = 3.5$

$y = a \cdot b^x$



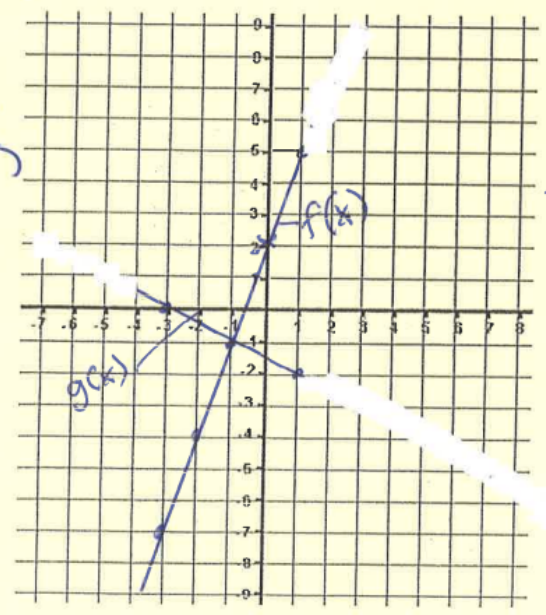
b) The number of years it takes for the diameter to triple 10.5 solve exponential equation

$$\begin{aligned}
 10.5(2.4)^{0.1t} &= 10.5 \\
 \text{divide} \\
 (2.4)^{0.1t} &= 3 \\
 \log(2.4)^{0.1t} &= \log 3 \\
 (0.1t)(\log 2.4) &= \log 3 \\
 &= \frac{1}{10} \left(\frac{\log 3}{\log 2.4} \right) \\
 &\approx 12.54 \text{ years}
 \end{aligned}$$

8

$f(x)$ is a linear function with gradient 3 and y -intercept 2, $g(x) = -0.5x - 1.5$. Plot these two lines on the grid below for the domain $-4 \leq x \leq 1$ and state the coordinates of the intersection of the two lines and the range of the functions.

gradient = "slope"
 $f(x)$
 $y = 3x + 2$
 $g(x) = -\frac{1}{2}x - 1.5$
 (use GPC to quickly get points)



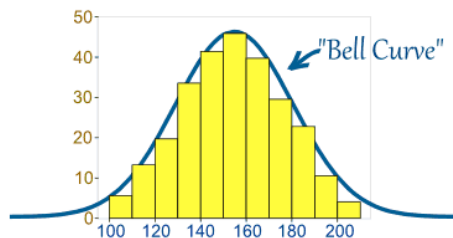
Intersection $(-1, -1)$
 Range of $f(x)$ in given domain:
 $-7 \leq y \leq 5$
 Range of $g(x)$ in given domain:
 $-2 \leq y \leq 0.5$

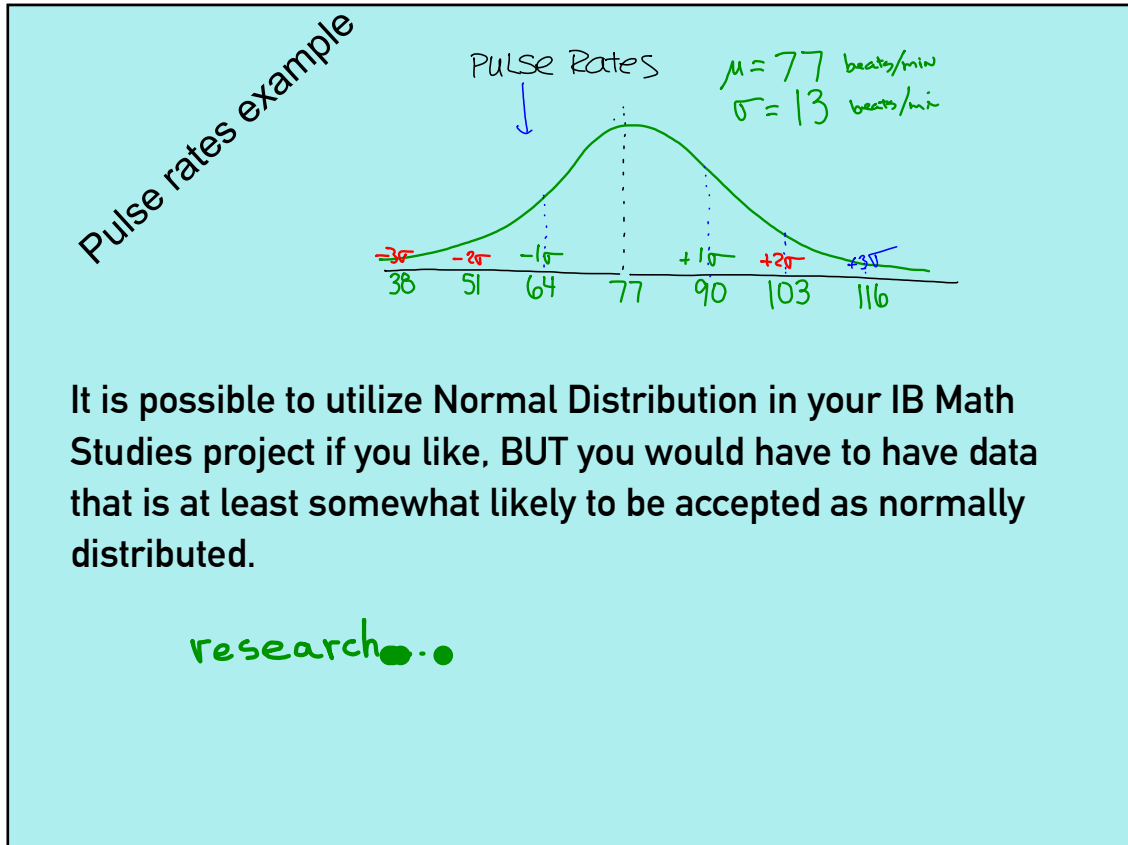
Today:

- ❁ **Be sure you have read about Data Collection (Packet P2)**
- ❁ **Continue with Normal Distribution**
- ❁ **See your test on Unit 2**

From last class:

Be able to construct diagrams
of Normal Distributions





Notes

So, now the challenge

Suppose the weights of a bag of organic potatoes is 40 lb with a std. deviation of 5 lb. (Assume a normal distribution).

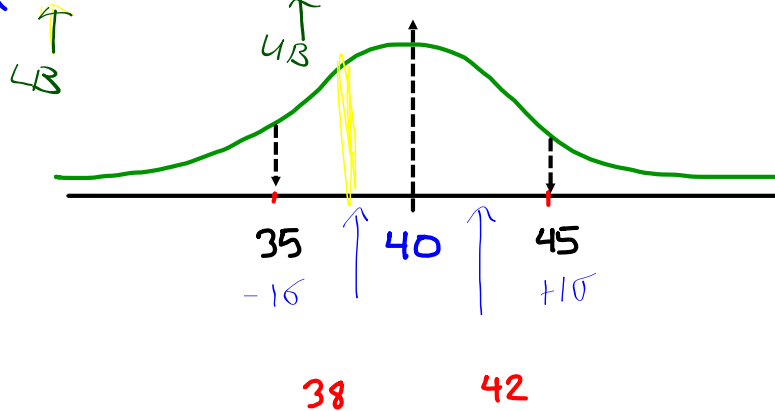
What is the probability of the next bag you pick up is between 38 and 42 lbs?

So, now the challenge

Suppose the weights of a bag of organic potatoes is 40 lb with a std. deviation of 5 lb. (Assume a normal distribution).

What is the probability of the next bag you pick up is between 38 and 42 lbs?

$$P(38 < x < 42)$$



Goal Today:

Calculate Probabilities and Expected Values of Normal Distributions

[for any std. deviation position]

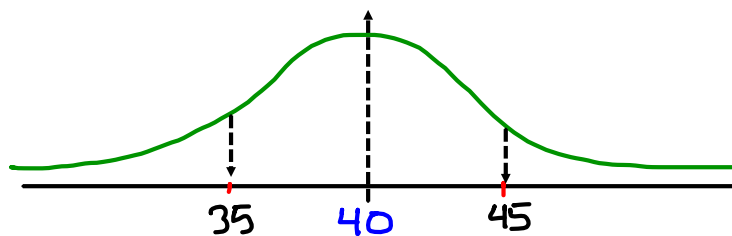
using the GDC

TNFGS

Take
Notes
For
Gosh
Sakes

$$P(38 < x < 42)$$

$$\mu = 40 \quad \sigma = 5$$



normalcdf(38, 42, 40, 5)

$P(38 < x < 42)$
 = 31.1%

Lower boundary upper boundary

μ σ

= .311 or 31.1%

$P(x > 46 | b)$

$= \text{normalcdf}(46, 10^{99}, 40, 5)$

$P(x > 46 | b) = .115$

11.5%

What is the probability of
being less than 41.5



$$P(x < 41.5) = 61.8\%$$

See your Test

- ✓ Each group gets a copy of solutions
- ✓ Learn from your mistakes!!
- ✓ I will collect all when finished.
- ✓ Feel free to come in and go over everything.

Assignment

HH - Ch. 10 Packet.....

- a) Study pp.300-301
- b) do problems on p.303.... 5, 6, 9
and p. 307.... 1, 4, 7

Must use
good notation
as in today's
notes.

