Normal Distribution Chall Congress is Normal?!

A set of data with a mean of 45 and a standard deviation of 8.3 is normally distributed.
Find each value, given its distance from the mean.

1) 1 standard deviation above the mean

$X = 45 + 8.3 =$ **53.3 units**

2) 3 standard deviations above the mean

$X = 45 + 3(8.3) =$ **69.9 units**

3) 1 standard deviation below the mean

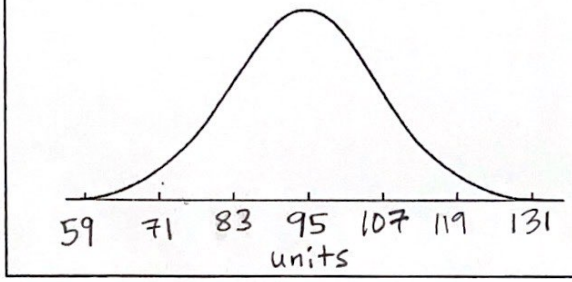
$X = 45 - 8.3 =$ **36.7 units**

4) 2 standard deviations below the mean

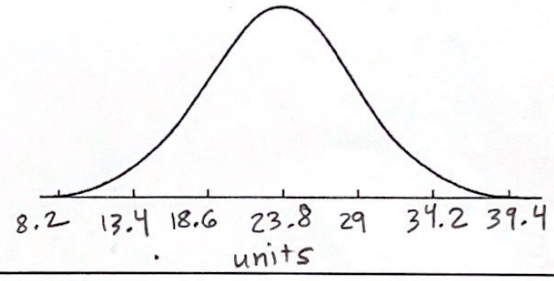
$X = 45 - 2(8.3) =$ **28.4 units**

5) Label the x-axis at 1, 2, and 3 standard deviations from the mean for each normal distribution.

mean = 95; standard deviation = 12



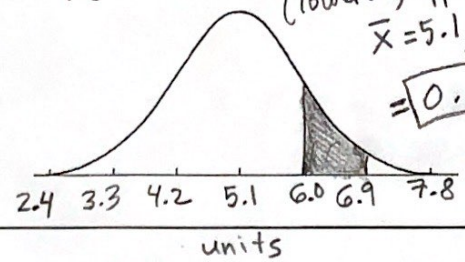
mean = 23.8; standard deviation = 5.2



6) A set of data has a normal distribution with a mean of 5.1 and a standard deviation of 0.9. Find the percent of data within each interval.

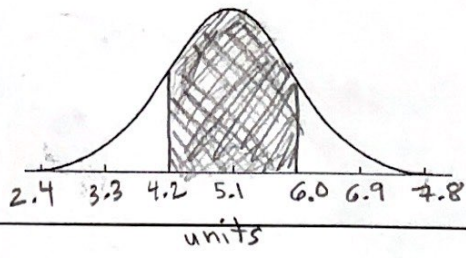
a. between 6.0 and 6.9

$P(6.0 < X < 6.9) =$ (lower=6, upper=6.9, $\bar{X} = 5.1$, $S_X = 0.9$) $=$ **0.1360**



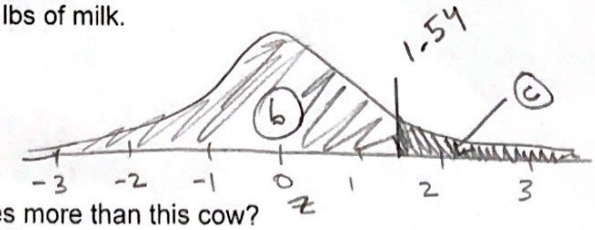
b. between 4.2 and 6.0

$P(4.2 < X < 6.0) =$ **0.6827**



7. The average milk production of California cows follows a Normal distribution with a mean of 70 lbs and a standard deviation of 13 lbs. One particular cow produces 90 lbs of milk.

a) Find this cow's z-score. $z = \frac{(90-70)}{13} = 1.54$



b) What percent of cows produce less than this cow?

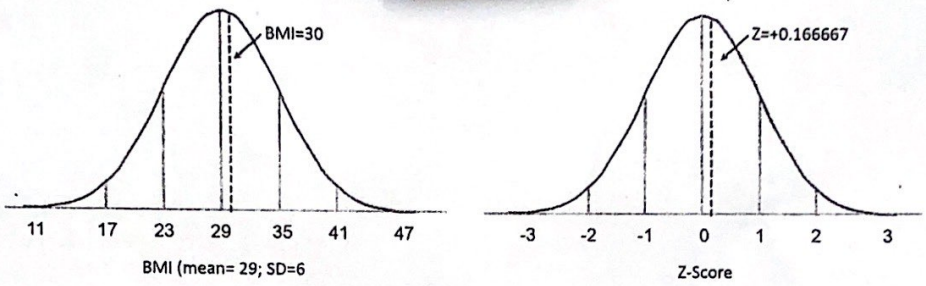
$P(z < 1.54) =$ **0.9382**

c) What is the probability of selecting a cow that produces more than this cow?

$P(z > 1.54) = 1 - 0.9382 =$ **0.0618**

Study the two graphs below

A standardized normal distribution has a me… …andard deviation of 1. Here's an example, where the vertical line representing BMI=30 … …he standardized distribution with Z = 0.16667 (right). The area to the **left** of Z = 0.16667 ca… … P(Z < 0.16667).

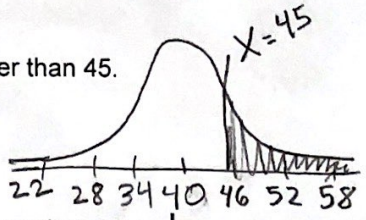


Use Table A on page 3 to look up the given probabilities: **shorturl.at/fGIK2**

1. $P(z > 1) = 1 - 0.8413 = \boxed{0.1587}$
2. $P(z < -2) = \boxed{0.0228}$
3. $P(-1 < z < 1) = 0.8413 - 0.1587 = \boxed{0.6826}$
4. $P(z > 3) = 1 - 0.9987 = \boxed{0.0013}$

6. Use the **normalcdf** feature of your calculator to find the probabilities. A complete solution should have: (i) Graph of normal distribution labeled and area shaded (ii) Notation that communicates what you are finding (iii) Indicate the mean, standard deviation, lower bound and upper bound clearly . You must label the statistics in your calculator syntax!!

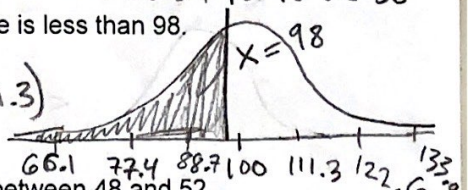
a) mean = 40; standard deviation = 6, find the probability that a value is greater than 45.



$P(X>45) = \text{normalCDF}(\text{lower} = 45, \text{upper} = \infty, \bar{X} = 40, S_X = 6)$

$= \boxed{0.2023}$

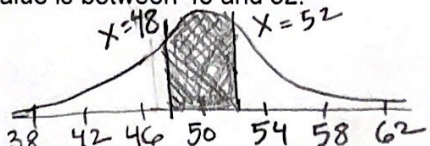
b) mean = 100; standard deviation = 11.3, find the probability that a value is less than 98.



$P(X<98) = \text{normalCDF}(\text{lower} = -\infty, \text{upper} = 98, \bar{X} = 100, S_X = 11.3)$

$= \boxed{0.4298}$

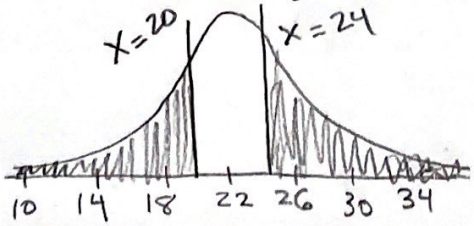
c) mean = 50; standard deviation = 4, find the probability that a value is between 48 and 52.



$P(48<X<52) = (\text{lower} = 48, \text{upper} = 52, \bar{X} = 50, S_X = 4)$

$= \boxed{0.3829}$

d) mean = 22; standard deviation = 4, find the probability that a value is less than 20 or greater than 24



$P(X<20 \cup X>24) = 0.3085 + 0.3085$

$= \boxed{0.6171}$