**ASSIGNMENT:** Standardized Normal "Bell" Curves
**DIRECTIONS:** Most statistics tend to cluster in the middle and have tails on either side. This creates a normal or "bell" curve. We can go a step further to standardize all data sets by creating a *standard* normal curve. Standard normal curves have a µ 0 and a σ of 1. Standard normal curves are "easy on the eyes."

To convert your data to this standard form, utilize the formula:

z = x − µ        where x is your unconverted data point, µ is your population mean,
  σ              and σ is your population standard deviation

The z-score you find with this formula represents the number of standard deviations from the mean. It will help you understand how much of the data lies in a certain region on the bell curve.

The Brahma chicken produces eggs with weights in grams that are normally distributed about a mean of 55 g with a standard deviation of 7 g. The eggs are classified as small, medium, large or extra large according to their weight, as shown in the table below.

| Size | Weight (g) |
|---|---|
| Small | Weight < 53 |
| Medium | $53 \leq$ Weight $< 63$ |
| Large | $63 \leq$ Weight $< 73$ |
| Extra Large | Weight $\geq 73$ |

(a)   Sketch a diagram of the distribution of the weight of Brahma chicken eggs. On your diagram, show clearly the boundaries for the classification of the eggs.   *[3 marks]* Sketch this diagram on the back of this page.

An egg is chosen at random.

(b)   Find the probability that the egg is

(i)   medium;

(ii)   extra large.   *[4 marks]*

There is a probability of 0.3 that a randomly chosen egg weighs more than *w* grams.

(c)   Find *w*.   *[2 marks]*

The probability that a Brahma chicken produces a large size egg is 0.121. Frank's Brahma chickens produce 2000 eggs each month.

(d)   Calculate an estimate of the number of large size eggs produced by Frank's chickens each month.   *[2 marks]*

Answer key (show all calculations for full marks):

a.) Ensure your customized diagram has the mean, standard deviation, and each size category marked.

b.) i. 48.6%    ii. 0.506%

c.) Use trial and error to find a suitable answer.

d.) Hint: Normally probability is calculated with a total of 1 (or 100%). Now the total is 2000.