

## Answer on Question #69902 – Math – Statistics and Probability

### Question

Free range eggs are produced on a farm. The weights of eggs are found to be normally distributed with a mean of 55g and a standard deviation of 1g. Using the empirical rule and no calculations, determine whether it is likely a randomly chosen egg from the farm would have the following weight.

- a. 51g
- b. 53g
- c. 56g

### Solution

By the empirical rule,

$$P(\mu - \sigma < X < \mu + \sigma) = 0.68,$$

$$P(\mu - 2\sigma < X < \mu + 2\sigma) = 0.95,$$

$$P(\mu - 3\sigma < X < \mu + 3\sigma) = 0.997.$$

So

a.  $P(X < 51) = P(X < \mu - 4\sigma) < P(X < \mu - 3\sigma) < \frac{1-0.997}{2} = 0.0015$  – very unlikely.

b.  $P(X < 53) = P(X < \mu - 2\sigma) = \frac{1-0.95}{2} = 0.025$  – unlikely.

c.  $P(X > 56) = P(X > \mu + \sigma) = \frac{1-0.68}{2} = 0.16$  – not unlikely.

**Answer:** a. very unlikely; b. unlikely; c. not unlikely.