

## MATH 120: Quiz 3 - 2/23/2022

(1) The distribution of actual weight of nuts in 12 oz. packages of mixed nuts produced by a certain machine is normal with a mean of 12.2 oz. and a standard deviation of 0.1 oz. Using the 68-95-99.7 % rule determine what percent of packages

- (a) Are underweight.
- (b) Contain more than 12.5 oz. of nuts.

Show key steps/reasons and a relevant sketch.

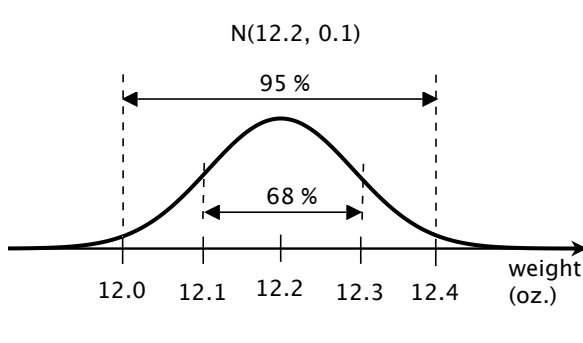
(2) Which, if any, of the following summary statistics are changed by adding a constant to each data value? (Answers are sufficient here – no reasons needed!)

- I. the mean
- II. the median
- III. the standard deviation

### Solution

(1) The sketch illustrates the 68-95-99.7% rule for this situation.

(a) A package is underweight if it contains fewer than 12 oz. of nuts. Since 12 oz. is exactly 2 SD below the mean, any packages farther below will be underweight. From the sketch, we see the



$$\text{answer} = \frac{100 - 95}{2} = \boxed{2.5 \%}$$

(b) Packages that contain more than 12.5 oz. of nuts are those that are more than 3 SD above the mean. Thus, the answer is  $\frac{100 - 99.7}{2} = \boxed{0.15 \%}$

- (2) I. the mean will change (increase or decrease) by the same constant.  
II. the median will change by the same constant.  
III. the standard deviation will remain the same as it was before.

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**Grading:** Total points possible = 6.

- 3 pt for (I): 1+1 pt for correct answer to (a) + (b).
  - 0.5pt = show some step(s) for at least (a) or (b).
  - 0.5pt = show a relevant sketch – doesn't need to show every detail, but must show a normal curve, with some application context.
- 3 pt for (II): 1pt for each correct answer.