AP Statistics Chapter 16 - 17 Review

****ANSWERS ONLY** (for explanations, please come in for tutorials)**

1. a) 0.589 b) 0.0145 c) 0.9883 d) $E(X) = 2.847,\ SD(X) = 1.3227$

2. a) 0.2404 b) 0.1203 c) 0.2508 d) 0.9987 e) 1.6978

3. a) check your notes! b) $E(X) = 88.35,\ SD(X) = 6.0259$ c) 0.9734

4. a) $E(X_1 + X_2 + \ldots + X_{80}) = \$485.60,\ SD(X_1 + X_2 + \ldots + X_{80}) = \$10.107$ b) 0.0771

5. In the table: 0.27, 0.345, 0.385

6. a) 4 inches b) heights of boys and girls must be independent!!! c) 5.4083 inchhes d) 0.1336

7. a) $E(3X) = 57,\ SD(3X) = 27$ b) $E(Y_1 + Y_2 + Y_3) = 72,\ SD(Y_1 + Y_2 + Y_3) = 8.66$

   c) $E(X + 4Y) = 115,\ SD(X + 4Y) = 21.9317$

8. ???

*9. a) 839.6 grams b) 7.91 grams

Full solutions for #9 start on the next page...

9. Each full carton of Grade A eggs consists of 1 randomly selected empty cardboard container and 12 randomly selected eggs.

The weights of the empty cardboard containers, *C*, have a mean of 20 grams and a standard deviation of 1.7 grams.

The weights of the individual Grade A eggs , *E*, have a mean of 68.3 grams and a standard deviation of 2.23 grams.

It is reasonable to assume independence between the weights of the empty cardboard containers and the weights of the eggs. It is also reasonable to assume independence among the weights of the 12 eggs that are randomly selected for a full carton.

Let the random variable *X* represent the weight (in grams) of a full carton of Grade A eggs (empty cardboard container **plus** 12 randomly selected eggs).

a) What is the mean of *X* ?

$$E(X) = E(\text{carton}) + E(\text{egg \#1}) + E(\text{egg \#2}) + \dots + E(\text{egg \#12})$$
$$= E(C) + 12\,E(E)$$
$$= 20 + 12(68.3)$$
$$= \boxed{839.6 \text{ grams}}$$

b) What is the standard deviation of *X* ?

You must add variances:

$$\text{Var}(X) = \text{Var}(C) + \text{Var}(E_1) + \text{Var}(E_2) + \dots + \text{Var}(E_{12})$$
$$= \text{Var}(C) + 12\,\text{Var}(E)$$
$$= 1.7^2 + 12 \cdot (2.23^2)$$

☆ Remember : $\text{Var} = SD^2$

$$\text{Var}(X) = 62.5648 \text{ grams}$$

$$SD(X) = \sqrt{62.5648} \approx \boxed{7.91 \text{ grams}}$$