Answer Key: Independent/Dependent T-Tests

1.) <u>Step 1</u>: H$_0$: $\mu_1 = \mu_2$ or $\overline{X}_1 = \overline{X}_2$, The new and old suntan lotions protect equally against sun burns. (Using the mu symbol is the more correct way to make this statement, but for an intro statistics, class x-bar is fine)

<u>Step 2</u>: H$_1$: $\mu_1 \neq \mu_2$ or $\overline{X}_1 \neq \overline{X}_2$, The new and old suntan lotions do not offer the same protection against sunburns.

<u>Step 3</u>: α =.05

<u>Step 4:</u> Reject H$_0$ if the absolute value of t-comp is equal to or greater than t-crit, where t-crit = 2.447, with df=6, and alpha = .05.

<u>Step 5</u>:

D	D^2
4	16
-2	4
-5	25
9	81
11	121
6	36
12	144
$\sum$D= 35	427=$\sum$D^2

$S^2_D = 42$

$S_D == 6.48$

$M_D = 5$

t-comp = = 2.04

-2.447   0   2.447

*If you know how to calculate standard deviation on your calculator or mobile device, then the squared differences column is unnecessary.

<u>Step 6</u>: a. A dependent-groups t-test was conducted to determine whether the old and new suntan lotions protect equally against burns. b. There was insufficient evidence to reject the H$_0$; t(6) = 2.04, p > .05. c. The new suntan lotion does not provide significantly more protection against sunburn than does the old suntan lotion. The average burn ratings for the new and old suntan groups were statistically similar (47.4 and 42.4, respectively). d. Because the new ingredient did not significantly increase the effectiveness of the suntan lotion, the company will begin experimenting with other ingredients that have been under research and development.

2.) t-crit =±2.080   t-crit = ±2.064   t-crit = ±2.704

3.) Your answer

4.) Because a dependent t-test controls for individual differences, the post-test scores "depend on" the pre-test scores. The advantages include not only the control for differences, but also that fewer participants are needed.

5.) LIKE…<u>WAAAAAYYYYYY SMARTER!!!</u>

6.) Your answer

7.) a. 20 females
    b. Pixel count: t-comp =5.216
    c. IQ: t-comp =.403

8.) Your answer

9.) Your answer