Homework Solutions
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Exercise 11

(a) The alternative hypothesis should be $H_1 : \mu_D > 0$.

(b) The population of differences must be normal (or nearly normal). With only 7 numbers, that is almost impossible to discern from a histogram. The QQ plot shows fairly good agreement with a normal distribution.

(c) We will show all seven steps.

1. Let $\mu_D = \mu_{\text{New}} - \mu_{\text{Regular}}$.

   $H_0 : \quad \mu_D = 0$
   $H_1 : \quad \mu_D > 0$

2. $\alpha = 0.05$.

3. Let $t = \dfrac{\overline{d} - 0}{s_D/\sqrt{n}}$.

4. Enter the differences into the TI-83 and use `1-Var-Stats` to find $\overline{d} = 2$ and $s_D = 3.464$. Then
$$t = \frac{2 - 0}{3.464/\sqrt{7}} = 1.528.$$

5. p-value = `tcdf(1.528,E99,6)` $= 0.0887$.

6. The p-value is greater then 0.05, so accept H_0.

7. The new instructional program had no effect.

(d) (i) The psychologist thought that there might be a great deal of variability in creativity scores for children with different IQ levels.