1. Ten different families are tested for the number of gallons of water a day they use before and after viewing a conservation video. The table below shows the usage of water for each family.

<table>
<thead>
<tr>
<th>Before</th>
<th>33</th>
<th>33</th>
<th>38</th>
<th>33</th>
<th>35</th>
<th>35</th>
<th>40</th>
<th>40</th>
<th>40</th>
<th>31</th>
</tr>
</thead>
<tbody>
<tr>
<td>After</td>
<td>34</td>
<td>28</td>
<td>25</td>
<td>28</td>
<td>35</td>
<td>33</td>
<td>31</td>
<td>28</td>
<td>35</td>
<td>33</td>
</tr>
</tbody>
</table>

Table 1: Water Usage

(a) (2 points) Find $\bar{d}$.

(b) (2 points) Find $s_d$.

(c) (3 points) Construct a 90% confidence interval for the mean of all differences $\mu_d$.

(d) (1 point) Find the margin of error.
At $\alpha = 0.05$ level of significance, test the claim that the viewing of the conservation video has been effective in reducing water usage by using the data in Table 1.

(e) (3 points) Clearly state $H_0$, $H_1$, identify the claim and type of test.

$H_0 : \quad$ \\
$H_1 : \quad$

(f) (3 points) Find all related critical values, draw the distribution, clearly mark and shade the critical region(s). Give the name of the program you used for this step. Drawing & Shading Required.

(g) (2 points) Find the computed test statistic and the P-value.

C.T.S. : _______ P-Value : _______

(h) (2 points) Use non-statistical terminology to state your final conclusion about the claim.

(h) _______

2. The table below shows the weights of eight adults before and after being on a diet for two months.

<table>
<thead>
<tr>
<th>Before</th>
<th>190</th>
<th>153</th>
<th>183</th>
<th>161</th>
<th>154</th>
<th>153</th>
<th>167</th>
<th>175</th>
</tr>
</thead>
<tbody>
<tr>
<td>After</td>
<td>183</td>
<td>144</td>
<td>181</td>
<td>166</td>
<td>140</td>
<td>155</td>
<td>155</td>
<td>175</td>
</tr>
</tbody>
</table>

Table 2: Diet Program
(a) (2 points) Find $\bar{d}$.

(b) (2 points) Find $s_d$.

(c) (3 points) Construct a 95% confidence interval for the mean of all differences $\mu_d$.

(d) (1 point) Find the margin of error.

At \( \alpha = 0.01 \) level of significance, test the claim that the diet is effective in reducing weight.

(e) (3 points) Clearly state \( H_0 \), \( H_1 \), identify the claim and type of test.

\[ H_0 : \] ________________

\[ H_1 : \] ________________

(f) (3 points) Find all related critical values, draw the distribution, clearly mark and shade the critical region(s). \textbf{Drawing & Shading Required.}

(g) (2 points) Find the computed test statistic and the P-value.

\[ \text{C.T.S.} : \] ________________ \quad \text{P-Value} : ________________

(h) (2 points) Use non-statistical terminology to state your final conclusion about the claim.

\[ \] ________________
3. Twelve different students were randomly selected and tested on Friday and Monday. The table below shows results for each student.

<table>
<thead>
<tr>
<th>Friday</th>
<th>75</th>
<th>83</th>
<th>78</th>
<th>93</th>
<th>65</th>
<th>75</th>
<th>90</th>
<th>80</th>
<th>100</th>
<th>81</th>
<th>68</th>
<th>90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>80</td>
<td>80</td>
<td>75</td>
<td>88</td>
<td>65</td>
<td>73</td>
<td>91</td>
<td>85</td>
<td>95</td>
<td>93</td>
<td>72</td>
<td>86</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 3:</th>
<th>Exam Results</th>
</tr>
</thead>
</table>

(a) (4 points) Construct a confidence interval for the mean of all differences \( \mu_d \).

(a) 

At \( \alpha = 0.1 \) level of significance, test the claim that the giving exams on Mondays helps increasing exam results by using the data in table 3.

(b) (3 points) Clearly state \( H_0 \), \( H_1 \), identify the claim and type of test.

\( H_0 : \) 

\( H_1 : \)

(c) (3 points) Find all related critical values, draw the distribution, clearly mark and shade the critical region(s). Drawing & Shading Required.

(d) (2 points) Find the computed test statistic and the P-value.

\[ \text{C.T.S.} : \] \hspace{2cm} \[ \text{P-Value} : \]

(e) (2 points) Use non-statistical terminology to state your final conclusion about the claim.

(e) 

Page 4 of 4 Study Guide 33 Total Points: 50