SAS codes

Exercise 4 Single Factor Experiments CRD

```
DATA PORTLAND_CEMENT_CRD;
INPUT PORTLAND_CEMENT OBS TENSILE_STRENGTH ;
LABEL PORTLAND_CEMENT='Percentage of Portland Cement'
OBS='Observation'
TENSILE_STRENGTH='Tensile Strength (lb/sq.inch)' ;
LINES ;
1 1 3129
1 2 3000
1 3 2865
1 4 2890
2 5 3200
2 6 3300
2 7 2975
2 8 3150
3 9 2800
3 10 2900
3 11 2985
3 12 3050
4 13 2600
4 14 2700
4 15 2600
4 16 2765
;
RUN ;
PROC PRINT DATA=PORTLAND_CEMENT_CRD ;
```

```
        TITLE 'Example Oneway ANOVA Portland Cement Data' ;
RUN ;
proc glm data=PORTLAND_CEMENT_CRD plots(only)=(diagnostics);
        class portland_cement;
        model tensile_strength=portland_cement;
        means portland_cement / hovtest=levene welch plots=none;
run;
PROC GLIMMIX DATA=PORTLAND_CEMENT_CRD;
        CLASS PORTLAND_CEMENT ;
        MODEL TENSILE_STRENGTH=PORTLAND_CEMENT ;
        OUTPUT OUT=NEW PREDICTED=PRED STUDENT=SRESID
        STUDENT(NOBLUP)=SMRESID;
RUN ;

PROC UNIVARIATE DATA=new NORMAL;
        VAR SRESID;
        histogram sresid / normal kernel;
run;
proc glm data=PORTLAND_CEMENT_CRD;
        class portland_cement;
        model tensile_strength=portland_cement;
        means portland_cement / hovtest=levene welch plots=none;
        lsmeans portland_cement / adjust=t pdiff alpha= 0.05;
        run;
quit;
```