Math 282 **Solutions to HW #2**

5.32

Here x = pre-exam total, and, y = final exam score.

Given $\bar{x} = 280, s_x = 30, \bar{y} = 75, s_y = 8, r = .6$.

(a) So slope $= b = \frac{rs_y}{s_x} = \frac{(.6)(8)}{30} = .16$, and y-intercept is $a = \bar{y} - b\bar{x} = 75 - (.16)(280) = 30.2$

(b) The regression line is $\hat{y} = 30.2 + .16x$. Julie's predicted score is $\hat{y} = 30.2 + .16(300) = 78.2$

(c) Since $r^2 = .36$, so only 36% of the variability in y is accounted for by the regression. Hence the estimate $\hat{y} = 78.2$ could be quite different from the real score.

8.11

Name	label	relabel	relabel
Barrington	01	31	61
Berwyn	02	32	62
…..	…..	….	….
Wheeling	29	59	89
Worth	30	60	90

Ignore 00,91-99: Line 125: 96 74 61 21 49 37 82

$\rightarrow$ 96 = ignore, 74 = 14, 61 = 01, 21, 49 = 19, 37 = 07, 82 = 22

SRS = (24, 01, 21, 19, 07, 22) = (Barrington, Elk Grove, New Trier, Orland, Palos, Proviso)

Name	label
Hyde Park	1
Jefferson	2
….	….
West Chicago	8

Ignore 0,9: Line 135: 6 6 9 2 5 5 5 6 5 8

$\rightarrow$ 6, 6 = ignore, 9 = ignore, 2, 5 , 5 = ignore, 5 = ignore, 6 = ignore, 5 = ignore, 8

SRS = (6, 2, 5, 8) = (Jefferson, North Chicago, Rogers Park, West Chicago)

Combine to get a stratified sample:

(Barrington, Elk Grove, Orland, Palos, Proviso, River Forest, Jefferson, North Chicago, Rogers Park, West Chicago)

10.32

a) Legitimate,   (b) Legitimate,   (c) Not legitimate (the total is more than 1).

10.33.

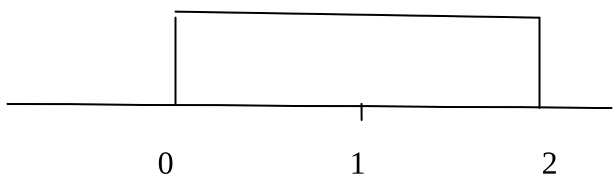
(a) The given probabilities add to: .13 + .29 + .30 = .72. So this probability must be 1 - .72 = .28.

(b) P(at least HS) = 1 – P(no HS) = 1 - .13 = .87.

10.49

(a) This is a continuous random variable because the set of possible values is an interval.

(b) The height should be .5, because the area under the curve should be 1.



(c) $P(Y \le 1) = .5 \times (1-0) = .5$, from the graph the area the of the rectangle on (0, 1).

10.50

(a) $P(.5 \le Y \le 1.3) = .5 \times (1.3 - .5) = .4$

(b) $P(Y \ge .8) = .5 \times (2 - .8) = .6$

11.28

(a) The mean of five untreated specimens has a standard deviation of $\frac{2.3}{\sqrt{5}} = 1.0286$ lb., so

$$P(\bar{x}_u > 50 = P\left(Z > \frac{50-58}{1.0286} \right) = P(Z > -7.78) = 1 \text{ (basically).}$$

[From Table A, P(z < -3.49) = .0002, so P(z > -3.49) = 1 - .0002 = .9998, which is very close to 1. As -7.78 is much smaller than -3.49, we get P(z > -7.78) is very close to 1. (basically means 'very close to').]

(b) The mean of five treated specimens has a standard deviation of $\frac{1.6}{\sqrt{5}} = .7155$ lb., so

$$P(\bar{x}_t > 50 = P\left(Z > \frac{50-30}{.7155} \right) = P(Z > 27.95) = 0 \text{ (basically).}$$

[From Table A, P(z < 3.49) = .9998, so P(z > 3.49) = 1 - .9998 = .0002, which is very close to 0. As 27.95 is much larger than 3.49, we get P(z > 27.95) is very close to 0. (basically means 'very close to').]

11.32

NOX levels (g./mi) vary according to N(.2, .05) distribution. By central limit theorem, for

$n = 25$, we get $\bar{x}$ has $N\left(.2, \frac{.05}{\sqrt{25}} = .01\right)$ distribution

From Table A, P($Z > 2.33$) = .01.

Now unstandardize: $L = .2 + (2.33)(.01) = .2233$ g/mi.