b_1 = slope
r = correlation
s_y = S.D of y
s_x = SD of x
b_0 = y-int
$\bar{y}$ = Avg y $\bar{x}$ = Avg x

Regression practice (using ideas from the formula sheet)

$b_1 = r\frac{s_y}{s_x}$ $b_0 = \bar{y} - b_1\bar{x}$ $\hat{y} = b_1 x + b_0$

1) A study was done a year or so ago that looked at Olympic jumper's performances and an association was noticed between the distance (measured in inches) of a winning Long Jump and the winning High Jump (measured in inches). Here are some of the summary statistics for the two Jumps:

Event	Mean	StdDev
Long Jump	314.1	20.71
High Jump	83.04	7.26

Correlation = .917

a) Although this information is given in inches, the actual Olympics jumps are measure in meters. How does changing the units change the correlation?

IT Doesn'T

b) Write the equation of the least squares regression line that can estimate High Jump from Long Jump: $b_1 = (.917)(\frac{7.26}{20.71}) = .321$

$\widehat{HJ} = .321(LJ) - 17.7861$ $b_0 = 83.04 - .321(314.1) = -17.7861$

c) Interpret the slope of the line:

As long Jump increases by one inch, we'd expect (or predict) the High Jump to increase by .321 inches.

d) In a year when the long jump was 1.32 standard deviations away from the mean

1) What is the predicted distance of the High Jump?

If LJ was 1.32 SD from $\bar{x}$ then it really is $314.1 + 1.32(20.71) = 341.4372$

$\widehat{HJ} = .321(341.4372) - 17.7861 = 91.8$

2) How many standard deviations would you predict the High jump to be from its mean?

$\frac{\text{data} - \text{mean}}{SD} = \frac{91.82 - 83.04}{7.26} = 1.21$

e) Discuss how you would get an estimate for a long jump if a high jump is 85 in.

You would need to Re-do the regression using HJ as x and LJ as $\hat{y}$ then put 85 into the equation.