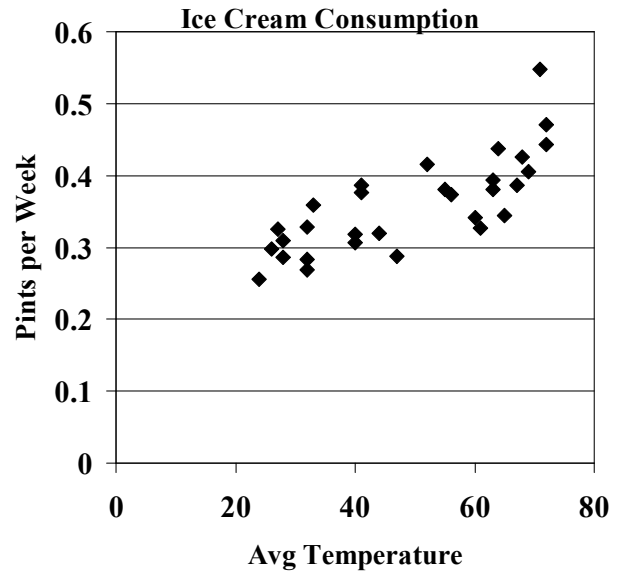
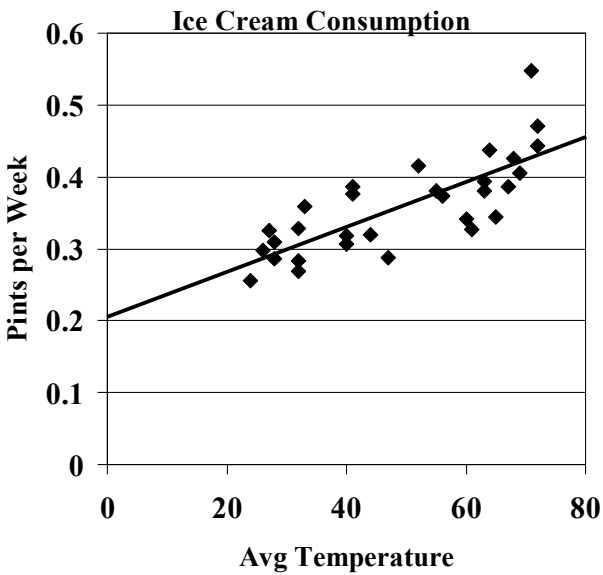


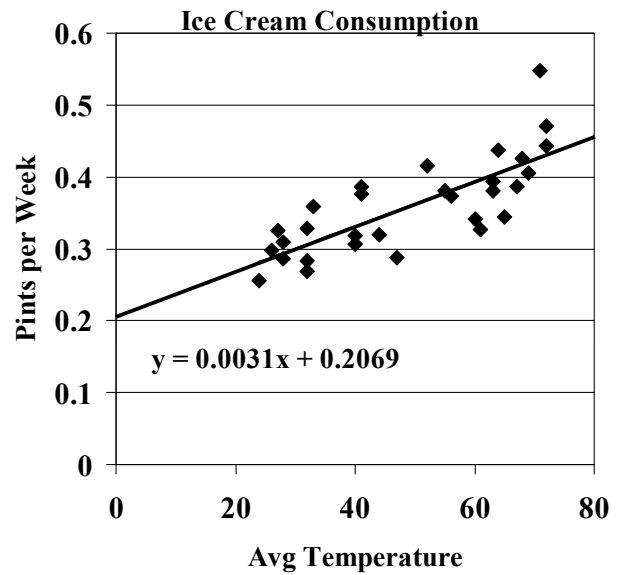
MAT102 Dr J Lubowsky Slide 1



MAT102 Dr J Lubowsky Slide 2



MAT102 Dr J Lubowsky Slide 3



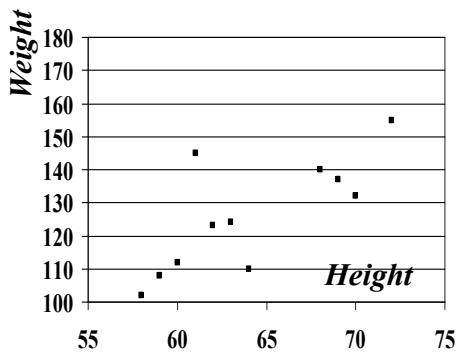
Prediction:
 For an avg temp of 45°,
 what is the expected weekly consumption?
 Let $x = 45$, then $y = 0.0031(45) + .2069 = 0.346$

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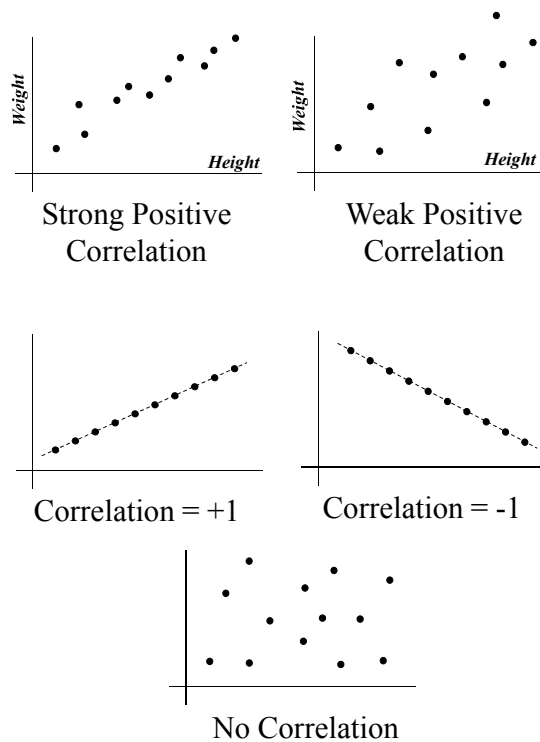
Weight v. Height

HEIGHT	62	58	64	69	61	70	59	60	63
WEIGHT	123	102	110	137	145	132	108	112	124

Scatter Diagram of Height v. Weight



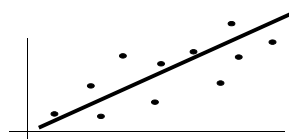
Strength of Linear Correlation:



To Quantify the Strength of the Correlation,

Calculate the Pearson Product Coefficient, r

$$r = \frac{n\sum(xy) - (\sum x)(\sum y)}{\sqrt{n\sum x^2 - (\sum x)^2} \sqrt{n\sum y^2 - (\sum y)^2}}$$



HEIGHT	62	58	64	69	61	70	59	60	63
WEIGHT	123	102	110	137	145	132	108	112	124

To have the calculator graph the data and compute the **Correlation Coefficient**:

1. Enter x and y data into L1 and L2.
STAT → EDIT → (Enter your data)
2. Turn on DiagnosticOn (once is enough).
2nd → 0 [Catalog] → DiagnosticOn
3. Select LinReg(ax+b)
STAT → CALC →
8:LinReg(a+bx) L1, L2

Reference DeSanto page 179

LinReg

Regression Equation

$y = a + bx$

$a = -6.416403786$

'a' value of $y = a + bx$

$b = 2.033123028$

'b' value of $y = a + bx$

$r^2 = .3433375584$

$r = .5859501331$

r is the correlation coefficient

+1 perfect positive correlation

-1 perfect negative correlation

0 no correlation

r^2 is the coefficient of determination

when expressed as a percent, it measures the percent of the variance in the data caused by the independent variable.

$H_0: \rho = 0$ (No correlation)

$H_a: \rho > 0$ (Positive correlation)

$\rho < 0$ (Negative correlation)

$\rho \neq 0$ (Non-zero correlation)

Cautions:

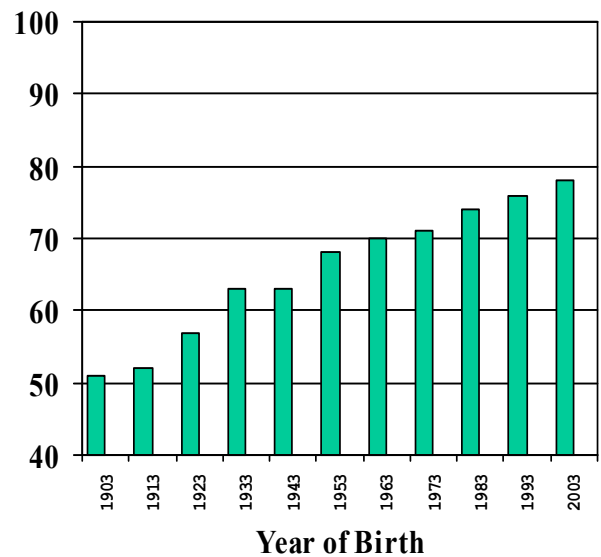
1. Possibility of non-linear correlation.
2. Correlation doesn't necessarily imply causation.

Life Span v. Year of Birth

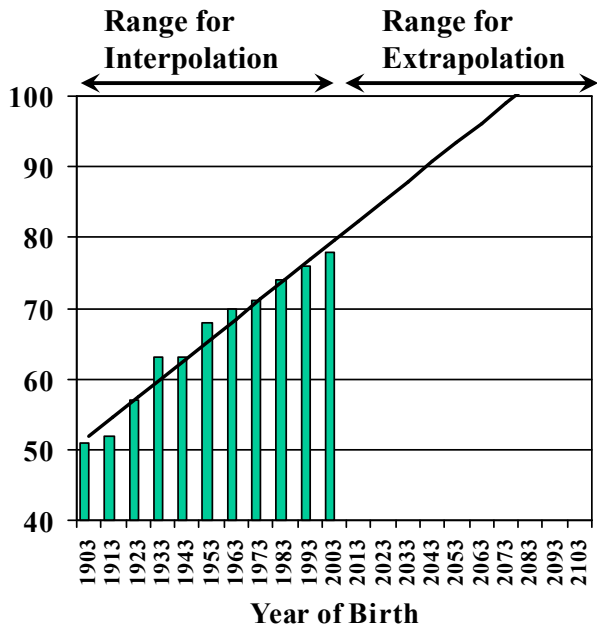
<u>Birth Year</u>	<u>Life Span</u>
1903	51
1913	52
1923	57
1933	63
1943	63
1953	68
1963	70
1973	71
1983	74
1993	76
2003	78

Source: National Vital Statistics Reports, Vol 53, No 6 November 10, 2004, and Center for Disease Control and Prevention

Life Span v Year of Birth



Life Span v Year of Birth



Is Percentage of Games Won Linearly Correlated to A Team's Payroll?

1992 Data	Total Payroll (Millions)	Pct of Games Won
Arizona	103	60.5
Atlanta	93	63.1
Chicago	76	41.4
Cincinnati	45	48.1
Colorado	57	45.1
Florida	42	48.8
Houston	63	51.9
LA Dodgers	95	56.8
Milwaukee	50	34.6
Montreal	39	51.2
NY Mets	95	46.6
Philadelphia	58	49.7
Pittsburgh	42	44.7
St Louis	75	59.9
San Diego	42	40.7
San Francisco	78	59.0

Problem

The Scientists at the Micro Biology Laboratory in Woods Hale MA want to determine if there is a linear relationship between the amount of rainfall in May and the number of mosquitoes. For each of the selected years, a random sample of data pairs have been collected and are listed in the table.

Year	Inches of Rain	Mosq Pop
2002	5.3	6.4
2001	2.7	2.3
2000	3.9	2.7
1999	2.4	1.2
1998	5.7	5.2
1997	3.5	2.6

Nassau County Rents

Sq Feet	Rent/Mo
1100	1875
588	1075
1250	1775
556	1050
825	1300
743	1475
660	1315
975	1400
1429	1900
800	1650
1906	4625
1077	1395

Is there a positive linear relationship between Monthly Rent and Square Feet?

If so, what would you expect to pay for a 3000 square foot apartment?