Lesson Notes 6-4 Modeling Data With a Line of Best Fit

A scatter plot is a set of points on a grid, used to visualize a relationship or possible trend in the data. If the points on a scatter plot seem to follow a linear trend (ie. form approximately a line), then there may be a linear relationship between the data. Technology can then be used to determine and graph the equation of the line of best fit.

A line of best fit can be used to predict values that are not recorded or plotted. To do so, read values from the line of best fit on a scatter plot, or use the equation of the line of best fit.

Example 1: The winning times for the men's 20 km biathlon in the Winter Olympics from 1964 to 2010 are shown in the table.

Year (X / Independent)	1964	1968	1972	1976	1980	1984
Winning Time (min) (Y - dependent)	80.4	73.8	75.9	74.2	68.3	71.9
Year	1988	1992	1994	1998	2006	2010
Winning Time (min)	56.6	57.6	57.4	56.2	54.3	48.4

a) Use technology to determine the equation of the line of best fit.

STAT → EDIT
enter data, Quit
STAT → CALC → LinReg
Enter twice

$y = -0.68x + 1419.4$

b) Determine a possible winning time for the event in the 2002 Olympics.

$y = -0.68(2002) + 1419.4 = 58.04$

Example 2: A city council needs to buy 15 000 L of liquid de-icer for the coming winter. One supplier provides the following quote:

(X / Y)

- 9 kL for $1.30/L
- 10 kL for $1.20L
- 11 kL for $1.15/L
- 12 kL for $1.10/L
- 13 kL for $1.05/L
- 14 kL for $0.95/L
- 16 kL for $0.84/L

a)Use linear regression to determine the equation of the line of best fit for the data

$y = -0.064x + 1.86$

b) What price should the city expect to pay per litre? $0.064/L

c) What price will be paid in all?

$y = -0.064(15) + 1.86 = \$0.90/L$