F Math 12

6.3 Modelling Data With A Line of Best Fit p. 401

Name _____

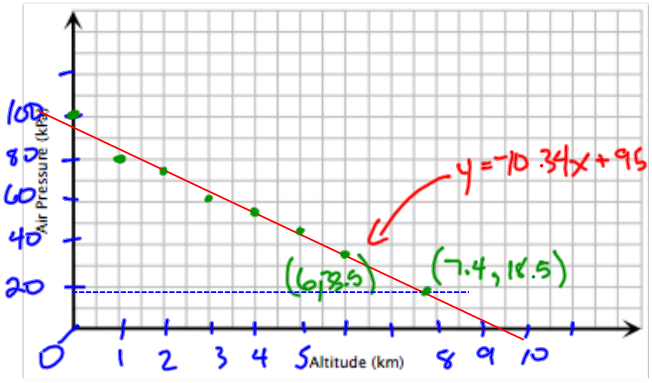
Date _____

Goal: Determine the linear function that best fits a set of data, and use the function to solve a problem.

1. **line of best fit:** A straight line that best approximates the trend in a scatter plot.
2. **regression function**: A line or curve of best fit, developed through a statistical analysis of data.
3. **interpolation**: The process used to estimate a value within the domain of a set of data, based on a trend.
4. **extrapolation**: The process used to estimate a value outside the domain of a set of data, based on a trend.

Example 1: The table shows how the outside air pressure changes as an airplane rises after takeoff.

a. Create a scatter plot on the graphing calculator
b. Plot the points on a graph



x y

Altitude (km)	Air Pressure (kPa)
0	101
1	80
2	74
3	62
4	55
5	46

c. What ***term*** best describes the trend?

linear

d. Write the linear regression equation of the data $y = ax + b$

$y = -10.34x + 95.52$

e. What will the air pressure be at an altitude of 6 km?

33.5 kPa @ 6 km extrapolation

f. At what altitude would the airplane be if the pressure was 18.5 kPa?

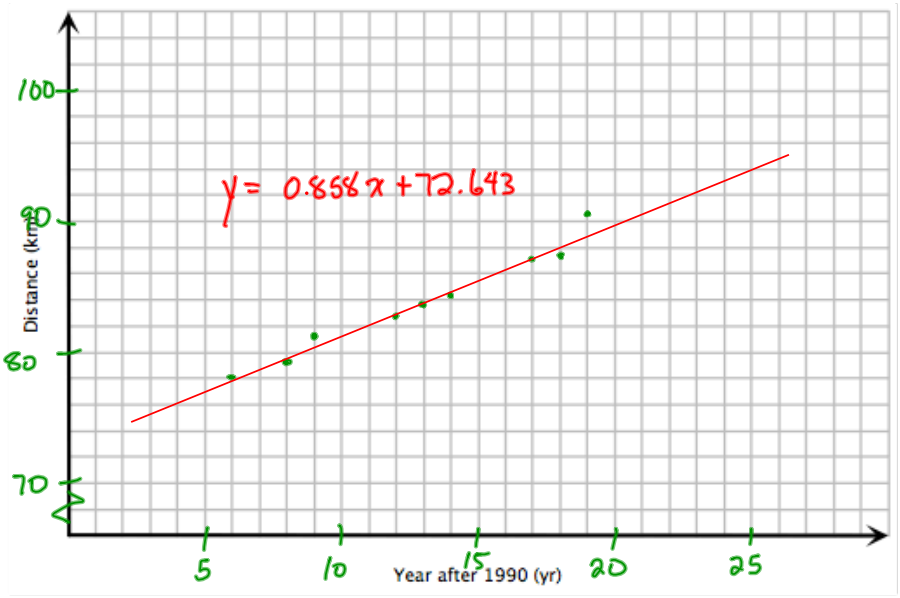
7.4 km extrapolation

Example 2: The one-hour record is the farthest distance travelled by bicycle in 1 hour. The table below shows the world-record distances and the years after 1990.

(Use Window Settings: Xmin = –1, Xmax = 30, Ymin = –10, Ymax = 110)

Years after 1990 (yr)	6	8	9	12	13	14	17	18	19
Distance (km)	78.04	79.14	81.16	82.60	83.72	84.22	86.77	87.12	90.60

a. Create a scatter plot on the graphing calculator.
b. Plot the points on a graph



c. Write the linear regression equation of the data.

$y = 0.858x + 72.643$

d. Based on this data, what was the world-record distance in 2000?

81.23 km

e. Based on this data, when might the world-record distance be 95 km?

26 years after 1990 → 2016

HW: 6.3 pp.407-412 #4, 5, 6, 7, 11 & 13