Recent Sea Level Rise — 23 Annual Tide Gauge Records. Three Year Average (black), Satellite Altimetry (red). Robert Rhode/Global Warming Art

The graph, produced by scientists at the University of Colorado and published in the IPCC Report-2001, shows the most recent global change in sea level since 1880 based on a variety of tide records and satellite data. The many colored curves show the individual tide gauge trends. The black line represents an average of the data in each year.

Problem 1 - If you were to draw a straight line through the curve between 1920 and 2000 representing the average of the data, what would be the slope of that line?

Problem 2 - What would be the equation of the straight line in A) Two-Point Form? B) Point-Slope Form? C) Slope-Intercept Form?

Problem 3 - If the causes for the rise remained the same, what would you predict for the sea level rise in A) 2050? B) 2100? C) 2150?

Problem 1 - If you were to draw a straight line through the curve between 1920 and 2000 representing the average of the data, what would be the slope of that line? Answer; See figure below. First, selecting any two convenient points on this line, for example X= 1910 and Y = 0 cm (1910, +0) and X = 1980 Y= +15 cm (1980, +15). The slope is given by m = (y2-y1)/(x2-x1) = 15 cm / 70 years = 0.21 cm/year.

Problem 2 - What would be the equation of the straight line in A) Two-Point Form? B) Point-Slope Form? C) Slope-Intercept Form? Answer:

$$A) \quad y - y1 = \frac{(y2 - y1)}{(x2 - x1)}(x - x1) \quad so \quad y - 0 = \frac{(15 - 0)}{(1980 - 1910)}(x - 1910)$$

B)   y - y1 = m (x - x1)   so   y - 0 = 0.21 (x - 1910)

C) y = 0.21 x - 0.21(1910)   so   y = 0.21x - 401.1

Problem 3 - If the causes for the rise remained the same, what would you predict for the sea level rise in A) 2050? B) 2100? C) 2150? Answer:
A) y = 0.21 (2050) - 401.1 = 29.4 centimeters.   (Note; this equals 12 inches)
B) y = 0.21 (2100) - 401.1 = 39.9 centimeters   (Note: this equals 16 inches)
C) y = 0.21 (2150) - 401.1 = 50.4 centimeters.   (Note: this equals 20 inches)

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