Assignment

Write

Explain why it is important to analyze the coefficient of determination when calculating a regression equation.

Remember

A regression equation is a function that models the relationship between two variables in a scatter plot. The coefficient of determination, or R^2, measures the strength of the relationship between the original data and their regression equation. The value ranges from 0 to 1, with a value of 1 indicating a perfect fit between the regression equation and the original data.

Practice

John Earvinson's free throw percentage has fluctuated each year since he became a professional basketball player. The table displays his free throw percentage for each year of his career. John did not play during his 7th and 12th years due to injury.

1. Create a scatter plot of the data. Predict the type of polynomial that best fits the data. Explain your reasoning.
2. Use technology to determine the regression equation for the data. Round decimals to the nearest thousandth. Sketch the scatter plot and your regression equation on a coordinate plane. How well does the regression equation model the given data? Explain your reasoning.
3. Consider the data and your regression equation. Predict John's free throw percentage if he had played in his 7th year. How accurate is this prediction? Explain your reasoning.
4. Consider the data and your regression equation. Predict John's free throw percentage in his 18th year. How accurate is this prediction? Explain your reasoning.
5. For what interval(s) is the model appropriate for this problem situation? Explain your reasoning.
6. Sketch a polynomial curve that you believe accurately predicts John's free throw percentage over a 20-year career. Explain your reasoning.
7. Predict the type of polynomial that you sketched in part (g). Explain your reasoning.

Time Since Becoming a Professional Player (years)	Free Throw Percentage
1	47.1
2	47.9
3	50.2
4	51.5
5	53.0
6	51.4
7	Did Not Play
8	54.7
9	58.3
10	61.4
11	63.3
12	Did Not Play
13	66.0
14	65.2

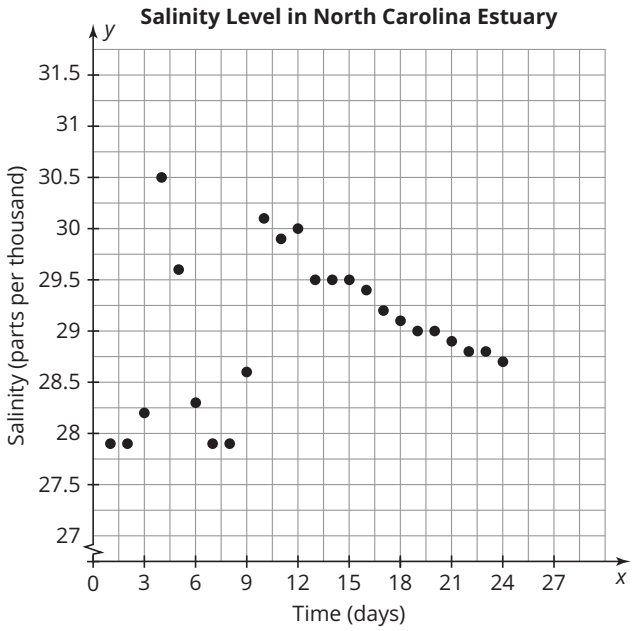
Stretch

The table shows the salinity levels in an estuary in North Carolina over a period of 24 days. A scatter plot of this data is also shown.

Time (days)	1	2	3	4	5	6	7	8
Salinity (parts per thousand)	27.9	27.9	28.2	30.5	29.6	28.3	27.9	27.9

Time (days)	9	10	11	12	13	14	15	16
Salinity (parts per thousand)	28.6	30.1	29.9	30	29.5	29.5	29.5	29.4

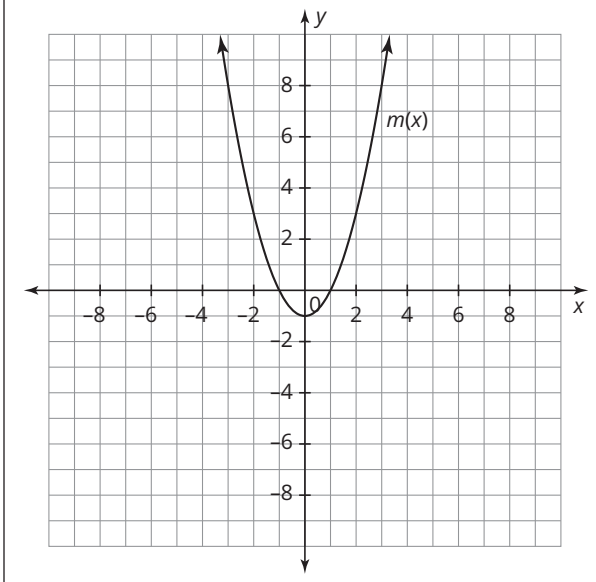
Time (days)	17	18	19	20	21	22	23	24
Salinity (parts per thousand)	29.2	29.1	29.0	29.0	28.9	28.8	28.8	28.7



1. Write a piecewise function that models the salinity over the 24-day period.
2. Graph the function on the scatter plot.

Review

1. Expand $(2x - y)^4$.
2. Determine the coefficient of x^3y^5 in the expansion of $(5x + 2y)^8$.
3. Determine which polynomial function has the greatest average rate of change over the interval (0, 1). Explain your reasoning.

$g(x) = -x^3 - 2x^2 + 5x - 3$	

4. A manufacturer keeps records on a piece of equipment on the floor for 15 days to see whether is working properly. In order to maintain stability in the process, the amount of calibration in the piece of equipment must be less than or equal to 11.75 cm.
   The function $c(x) = 0.11x^3 - 2.07x^2 + 9.81x + 2$ represents the calibration x days since the process began.
   a. Write an inequality that represents the calibration of the machine being in the safe range.
   b. Solve the inequality and determine the time intervals during which the calibration of the machine is safe for the process.
5. Determine whether $(m - 3)$ is a factor of $m^3 - 13m^2 + 24m + 18$.