EOC REVIEW: Models & Regression

Standard

A2.S.ID.B.2 Represent data on two quantitative variables on a scatter plot and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data.

1. The average cost of whole milk for several recent years is listed in the table. What is the equation for the line of best fit. Based on the model, what would you expect to pay in the year 2020 for a gallon of milk? Let 1998 represent year 1.

Year	1998	2000	2002	2004	2006	2008
Cost of gallon	2.65	2.89	3.00	3.01	3.20	3.77

2. Find an equation in standard form of the parabola passing through the points.
   a. (1, -3), (2, 0), (3, 9)

Independent Practice Models & Regression Assignment. Complete your assignment on a separate page. Show all work

1. Find an equation in standard form of the parabola passing through the points (3, -1), (2, -5) and (4, -5).

$y = -4x^2 + 24x - 37$

2. A player hits a tennis ball across the court and records the height of the ball at different times, as shown in the table below.

Time (s)	Height (ft)
0	5.5
1	6.0
2	5.5
3	4.0

   a. Find a quadratic model for the data.

$y = -\frac{1}{2}x^2 + x + 5.5$

   b. Use the model to estimate the height of the ball at 4 seconds. 1.5 ft

   c. What is the ball's maximum height?

6 ft

3. What polynomial function has a graph that passes through the four points (0, -3), (1, -1), (2, 5) and (-1, -7)? $y = x^3 - x^2 + 2x - 3$

4. For the data below that examines U.S. Federal Spending, compare two models and determine which one best fits the data. Which model seems more likely to represent the data set over time? Let *x* represent the number of years after 1900.

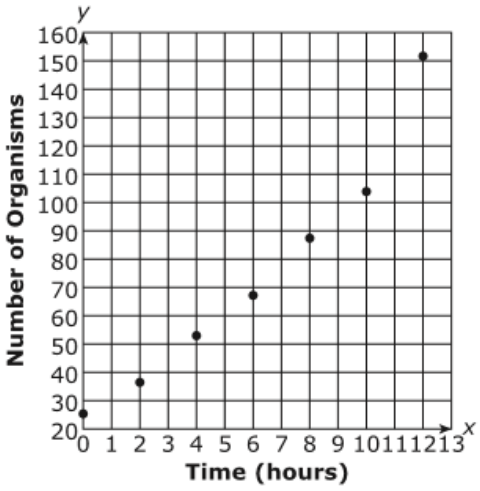
Cubic
$y = 0.028x^3 - 6.71x^2 + 578.2x + 226.7$

Linear
$y = 49.238x - 2614.29$

Year	Total (billions)
1965	630
1980	1300
1995	1950
2005	2650

6. The graph shows the exponential growth of the number of organisms in a Petri dish over a 12-hour period.

Time (hours)	Number of Organisms
0	25
2	36
4	52
6	68
8	88
10	104
12	151



a. Write an exponential function *N(t)* to model the data.

$N(t) = 27.035(1.15)^x$

b. To the nearest whole organism, how many organisms are expected to be in the Petri dish at 24 hours?

about 841