Regression Activity

Use a calculator to find a regression equation for each problem below.

Linear Regression

1. Is there a relationship between Math SAT scores and the number of hours spent studying for the test? A study was conducted involving 20 students as they prepared for and took the Math section of the SAT Exam. Determine a linear regression equation to represent this data.

$y = 25.33x + 353.16$

Hours Spent Studying	Math SAT Score
4	390
9	580
10	650
14	730
4	410
7	530
12	600
22	790
1	350
3	400
8	590
11	640
5	450
6	520
10	690
11	690
16	770
13	700
13	730
10	640

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2. Wilson Company provided the following information concerning the number of monthly service calls provided and the total cost incurred for its pest control operations for each month during 2016. Find the linear regression equation to represent this data.

Year	Number of Service Calls	Total Cost
January	1,040	$33,600
February	1,200	36,300
March	1,260	37,800
April	1,100	35,500
May	1,220	36,600
June	1,010	32,900
July	1,190	36,200
August	1,050	33,400
September	1,210	37,700
October	1,250	37,400
November	1,060	33,800
December	1,280	38,100

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3. A convenience store manager notices that sales of soft drinks are higher on hotter days. Use the data on the right to find a linear regression equation for the situation.

High Temperature (°F)	Number of cans sold
55	340
58	335
64	410
68	460
70	450
75	610
80	735
84	780

Quadratic Regression

4. a. Amery recorded the distance and height of a basketball when shooting a free throw. Find the quadratic equation for the relationship of the horizontal distance and the height of the ball.
   b. Using this function, what is the approximate maximum height of the ball.

Distance (feet), x	Height (feet), f(x)
0	4
2	8.4
6	12.1
9	14.2
12	13.2
13	10.5
15	9.8

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5. a. This table show the population of a city every ten years since 1970. Find the best-fitting quadratic model for the data.

   b. Using this model, what will be the estimate population on 2020?

Years Since 1970, x	Population (in thousands), y
0	489
10	801
20	1,202
30	1,998
40	2,959

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6. The table at the right show the horizontal distance (in feet) traveled by a baseball hit a various angles. The initial speed of the ball at the bat is constant. Determine a quadratic regression equation to represent this data.

Angle (degrees)	Distance (feet
10°	115.6
15°	157.2
20°	189.2
24°	220.8
30°	253.8
34°	269.2
40°	284.8
45°	285.0
48°	277.4
50°	269.2
58°	244.2
60°	231.4
64°	180.4

xponential Regression

7. The data at the right shows the cooling temperatures of a freshly brewed cup of coffee after being poured from the brewing pot into a serving cup. Determine an exponential regression equation to represent this data.

Time (mins)	Temp (° F)
0	179.5
5	168.7
8	158.1
11	149.2
15	141.7
18	134.6
22	125.4
25	123.5
30	116.3
34	113.2
38	109.1
42	105.7
45	102.2
50	100.5

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8. The table gives the number y (in millions) of cell phone subscribers from 1988 to 1997 where t is the number years since 1987. Find the exponential regression equation that models the data.

t	1	2	3	4	5	6	7	8	9	10
y	1.6	2.7	4.4	6.4	8.9	13.1	19.3	28.2	38.2	48.7

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9. You have just created your own website. You are keeping track of the number of hits to the site. The table shows the number y of hits in each of the first 10 months where x is the month number.

x	1	2	3	4	5	6	7	8	9	10
y	22	39	70	126	227	408	735	1322	2380	4285