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2022 - 05153

PART 1

```
$augcoeffmatrix
     [,1] [,2]  [,3]   [,4]  [,5]
[1,]    4   17    95    587    82
[2,]   17   95   587   3779   415
[3,]   95  587  3779  24827  2491
[4,]  587 3779 24827 165035 15973

$coefficients
[1] -12.150000  30.191667  -8.816667   0.775000

$polynomial_string
[1] "function(x) -12.1499999999985 + 30.1916666666647 * x ^ 1 +
-8.81666666666604 * x ^ 2 + 0.774999999999946 * x ^ 3"

$polynomial_function
function(x) -12.1499999999985 + 30.1916666666647 * x ^ 1 + -8.8
1666666666604 * x ^ 2 + 0.774999999999946 * x ^ 3
<environment: 0x00000277349a07a8>
```

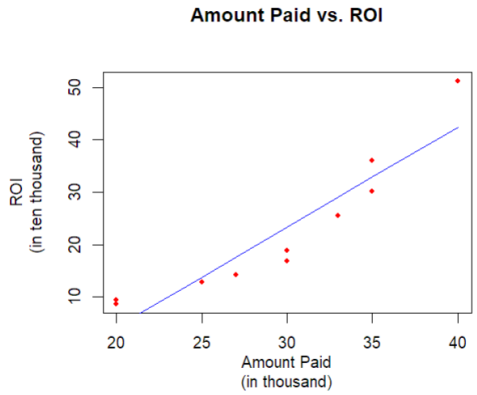
Figure 1. Sample Run from Exercise.

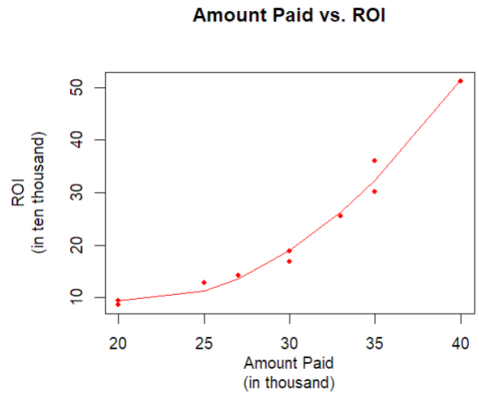
```
$augcoeffmatrix
     [,1] [,2] [,3]   [,4]
[1,]    6   15   55  152.6
[2,]   15   55  225  585.6
[3,]   55  225  979 2488.8

$coefficients
[1] 2.478571 2.359286 1.860714

$polynomial_string
[1] "function(x) 2.47857142857141 + 2.35928571428574 * x ^ 1 + 1.860714285714
28 * x ^ 2"

$polynomial_function
function(x) 2.47857142857141 + 2.35928571428574 * x ^ 1 + 1.86071428571428 *
x ^ 2
<environment: 0x0000027735bb0908>
```

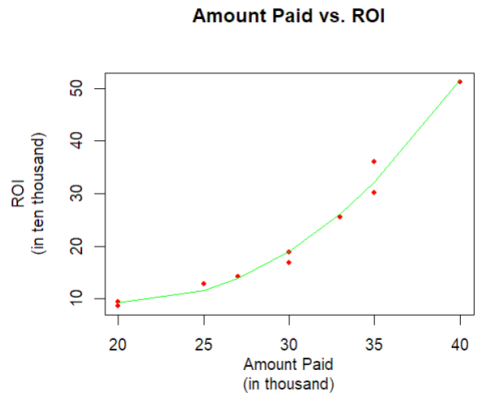
Figure 2. Sample Run from Lab Handout.

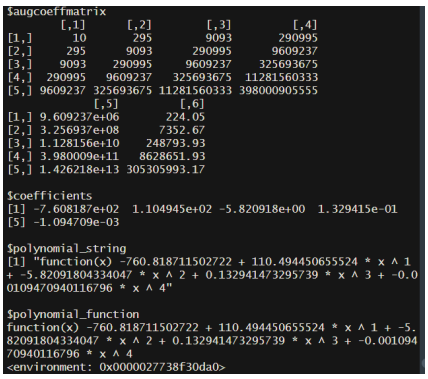
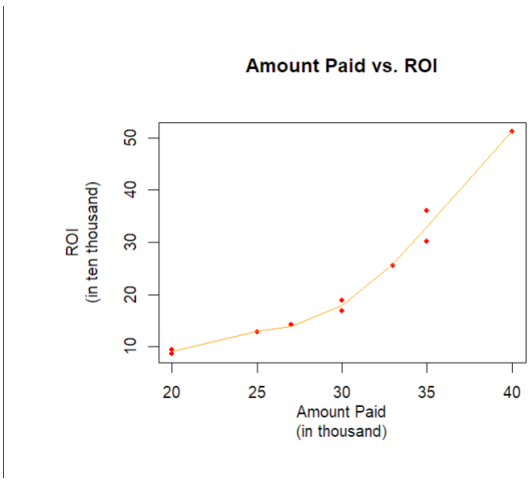
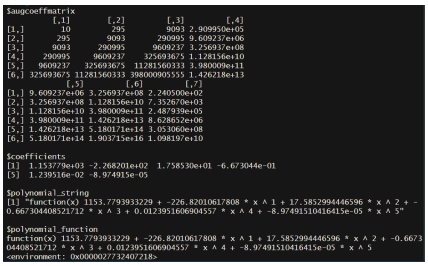
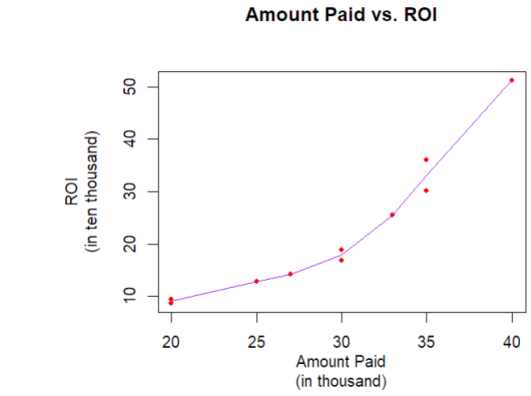
PART 2

Degree	Answer	Graph

1	`$augcoeffmatrix`
	`     [,1] [,2]    [,3]`
	`[1,]   10  295  224.05`
	`[2,]  295 9093 7352.67`
	
	`$coefficients`
	`[1] -33.739052   1.903188`
	
	`$polynomial_string`
	`[1] "function(x) -33.7390524967988 + 1.90318822023047 * x ^ 1"`
	
	`$polynomial_function`
	`function(x) -33.7390524967988 + 1.90318822023047 * x ^ 1`
	`<environment: 0x00000277361beee8>`
	
	function(x) = -33.7390524967988 + 1.90318822023047 * x ^ 1
		

2	`$augcoeffmatrix`
	`     [,1]   [,2]    [,3]      [,4]`
	`[1,]   10    295    9093    224.05`
	`[2,]  295   9093  290995   7352.67`
	`[3,] 9093 290995 9609237 248793.93`
	
	`$coefficients`
	`[1] 58.9457390 -4.7681207  0.1145044`
	
	`$polynomial_string`
	`[1] "function(x) 58.9457390099187 + -4.76812072692561 * x ^ 1`
	`+ 0.114504368673031 * x ^ 2"`
	
	`$polynomial_function`
	`function(x) 58.9457390099187 + -4.76812072692561 * x ^ 1 + 0.1`
	`14504368673031 * x ^ 2`
	`<environment: 0x0000027738b9c6f8>`
	
	function(x) = 58.9457390099187 + -4.76812072692561 * x ^ 1 + 0.114504368673031 * x ^ 2
		

3	`$augcoeffmatrix`
	`       [,1]     [,2]      [,3]       [,4]      [,5]`
	`[1,]    10     295      9093     290995     224.05`
	`[2,]   295    9093    290995    9609237    7352.67`
	`[3,]  9093  290995   9609237  325693675  248793.93`
	`[4,] 290995 9609237 325693675 11281560333 8628651.93`
	
	`$coefficients`
	`[1] 36.0460961887 -2.3094931649  0.0295500927  0.0009491247`
	
	`$polynomial_string`
	`[1] "function(x) 36.0460961887288 + -2.3094931649286 * x ^ 1 +`
	`0.0295500927169468 * x ^ 2 + 0.00094912465400247 9 * x ^ 3"`
	
	`$polynomial_function`
	`function(x) 36.0460961887288 + -2.3094931649286 * x ^ 1 + 0.02`
	`95500927169468 * x ^ 2 + 0.00094912465400247 9 * x ^ 3`
	`<environment: 0x00000277392d7358>`
	
	function(x) = 36.0460961887288 + -2.3094931649286 * x ^ 1 + 0.0295500927169468 * x ^ 2 + 0.00094912465400247 9 * x ^ 3
		

4	 function(x) = -760.818711502722 + 110.494450655524 * x ^ 1 + -5.82091804334047 * x ^ 2 + 0.132941473295739 * x ^ 3 + -0.00109470940116796 * x ^ 4	
5	 function(x) = 1153.7793933229 + -226.82010617808 * x ^ 1 + 17.5852994446596 * x ^ 2 + -0.667304408521712 * x ^ 3 + 0.0123951606904557 * x ^ 4 + -8.97491510416415e-05 * x ^ 5	

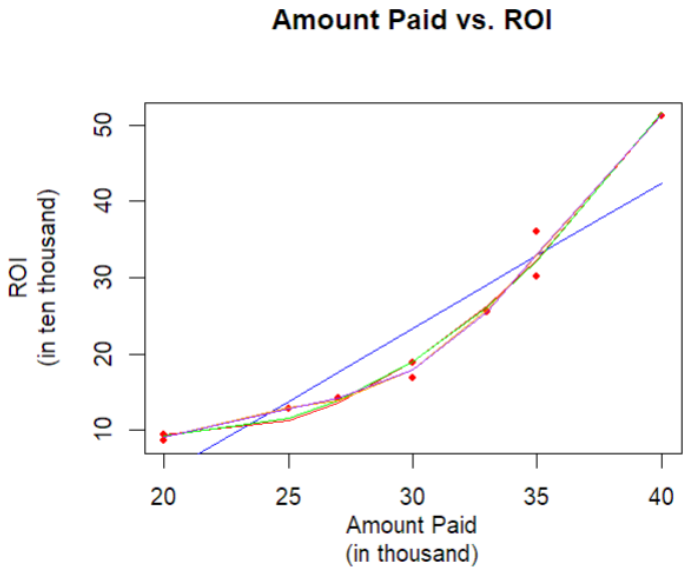


Figure 3. Consolidated graphs of degrees one to five.

The figure above shows how different polynomial regression models fit the data. The data points represent the relationship between the amount paid and the return on investment (ROI). The models range from degree one (linear) to degree five (quintic). The main findings are:

- There is a positive correlation between the amount paid and the ROI, meaning that paying more leads to higher returns. This is especially highlighted by the linear model (degree one), which has a positive slope.

- The regression exhibits curvature from the second to the fifth degree. This is because the variables have a higher degree, which leads to a polynomial regression function.

- Moreover, it is worth noting that the function has only slight variations in its curvature after the second degree.