

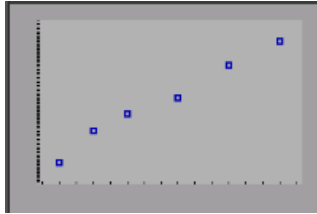
# MAT146: Independent Research Project

age weight

interesting relevant informative

L1	L2	L3
8	120	
10	140	
12	150	
15	160	
18	180	
21	195	

```
ExpReg
y=a*b^x
a=95.55114628
b=1.035409274
```



```
ExpReg
y=a*b^x
a=95.55114628
b=1.035409274
r^2=.9658666237
r=.9827851361
```

Talking:

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Regression Project Part 1: Data Collection

- Did the student show the material learned in calculus can be useful in a topic that is relevant AND interesting to the individual student?
- Is it cited if the source of the data is from the library or internet versus data that is collected in an experiment?  
*www.reporter.com*
- Did the student submit 9 data points Label the x and y variables. Give Nine Data points here.

<i>X:</i>	<i>8</i>	<i>10</i>	<i>12</i>	<i>14</i>		<i>18</i>	<i>21</i>		
<i>Y:</i>	<i>120</i>	<i>140</i>	<i>150</i>	<i>160</i>		<i>180</i>	<i>195</i>		

*W* → What do the x and y values mean. What are the units?  
 X: Age Units: yr  
 Y: Weight Units: lbs

- Did the student perform ALL regressions.

LinReg: a=\_\_\_ b=\_\_\_ r<sup>2</sup>=\_\_\_

4. Did the student perform ALL regressions.

LinReg: a=\_\_\_ b=\_\_\_ r<sup>2</sup>=\_\_\_

QuadReg: a=\_\_\_ b=\_\_\_ c=\_\_\_ r<sup>2</sup>=\_\_\_

CubicReg: a=\_\_\_ b=\_\_\_ c=\_\_\_ d=\_\_\_ r<sup>2</sup>=\_\_\_

QuartReg: a=\_\_\_ b=\_\_\_ c=\_\_\_ d=\_\_\_ e=\_\_\_

ExpReg: a=\_\_\_ b=\_\_\_ r<sup>2</sup>=\_\_\_

LnReg: a=\_\_\_ b=\_\_\_ r<sup>2</sup>=\_\_\_

SinReg\*: a=\_\_\_ b=\_\_\_ c=\_\_\_ d=\_\_\_

Do ALL of these.

95.5 1.03 .9658

\*If you are having problems with SinReg, make sure you use SinReg 1,L1,L2,# where # is twice the distance from largest to smallest x value.

0. Is it cited if the source of the data is from the library or internet versus data that is collected in an experiment?

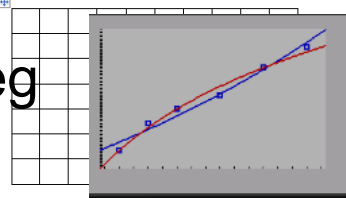
Please site the source of your data here: [www.rporter.com](http://www.rporter.com)

0. Identify the variables give the data.

X:	8	10	12	etc.				
Y:								

1. Is the data plotted in an appropriate window? Are 2 or more regressions graphed with data plots?

Label x and y axis, show what you get after zoomstat. Put all the regressions on the same graph.



stat > calc 9:Inreg

y2=var 5: >> 1:

<p>2. Did the student identify the best regression. What makes the regression the best?</p> <p>LinReg: a=___ b=___ r<sup>2</sup>=___ (good?)___</p> <p>QuadReg: a=___ b=___ c=___ r<sup>2</sup>=___ (good?)___</p> <p>CubicReg: a=___ b=___ c=___ d=___ r<sup>2</sup>=___ (good?)___</p> <p>QuartReg: a=___ b=___ c=___ d=___ e=___ r<sup>2</sup>=___ (good?)___</p> <p>ExpReg: a=___ b=___ r<sup>2</sup>=___ (good?)___</p> <p>LnReg: a=___ b=___ r<sup>2</sup>=___ (good?)___</p> <p>sinReg: a=___ b=___ c=___ d=___ (good?)___</p> <p>(mark the two that are the best)</p>									
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fill in from pt1

95.5... 982

33

better correlation  
yes, prob. leveling in weight  
NOT growing exponentially

solver

0=regeq-y

e1:regeq

e2:y

3. Did the student evaluate (predict) and solve for a value of one of the polynomial regressions.

	Best Regression: ln reg	Second Regression: exp reg
x-value evaluate 47yrs	250.85lbs	490.34lbs
y-value solved 300lbs	91.49yrs	32.88yrs

In words, explain what the best evaluation predicts:  
According to the natural log regression, and the data given, at 47 years old, I should weigh 251lbs.

In words, explain what the best solved regression predicts:  
According to the natural log regression, and the data given, I should weigh 300lbs at the age of 91.

4. What is the end behavior for the polynomials?

decide first

-33.23597503145+73.786258

X=47  
Y=250.85201273574  
bound=(-1e99,1e99)  
E1-E2=0

95.551146277908\*1.0354092

X=47  
Y=490.34558457991  
bound=(-1e99,1e99)  
E1-E2=0

-33.23597503145+73.786258

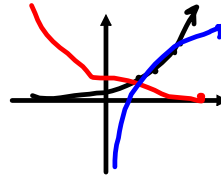
X=91.490350686947  
Y=300  
bound=-1  
E1-E2=0

95.551146277908\*1.0354092

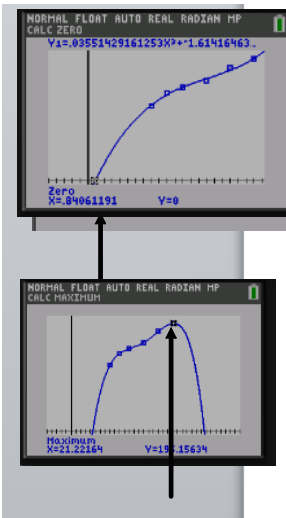
X=32.880075239818  
Y=300  
bound=(-1e99,1e99)  
E1-E2=0

4. What is the end behavior for the polynomials?

LinReg: left:  $-\infty$  Right:  $\infty$   
 QuadReg: left:  $-\infty$  Right:  $-\infty$   
 CubicReg: left: \_\_\_\_\_ Right: \_\_\_\_\_  
 QuartReg: left: \_\_\_\_\_ Right: \_\_\_\_\_  
 ExpReg: left:  $0$   $\infty$  Right:  $\infty$   $0$   
 LnReg: left: none Right:  $\infty$   
 sinReg: left: none Right: none



QuadReg  
 $y = ax^2 + bx + c$   
 $a = -.0701151124$   
 $b = 7.483008502$   
 $c = 67.90611694$   
 $R^2 = .9851647732$



5. Did the student find the zero for the cubic regression?

$X = .84$   $Y = 0$

Express the meaning in words:

At .84yrs old, the cubic regression says I weigh nothing

Did the student find the extrema for the quartic regression?  $X = 21.22$   $Y = 195.15$

Express the meaning in words:

accroding to the quartic regression, at 21yrs old I'll weigh my maximum of 195lbs.

6. Did the student find the exponential regression's rate of growth or decay. (Find  $\ln(b)$  and write as percent)

6. Did the student find the exponential regression's rate of growth or decay. (Find  $\ln(b)$  and write as  $3.48\%$  growth a year

$\ln(b)$  0.0347967819

Which is it? Growth(b is positive) or Decay(b is negative)

According to the exponential regression, I should be growing at 3.5% a year.

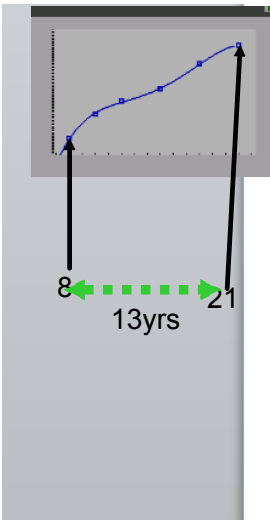
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7. Did the student identify the asymptote, domain, and range for EXPREG?

Asymptote:  $y=0$

Domain:  $(-\infty, \infty)$

Range:  $(0, \infty)$



8. Did the student discuss the asymptote, domain, and range for LNREG?

Asymptote:  $x=0$

Domain:  $(0, \infty)$

Range:  $(-\infty, \infty)$

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9. Decide on the period for the Sinereg. Period= 26

13yrs to go up + 13 yrs to go down=26

Do the SINREG and find the Period, Amplitude, and  $d$

Sin reg a= 31 b= 11.86 c= 159.17 d= 11.86170821

Amplitude: (|a|) 31

Period:  $(2\pi/b)$  26

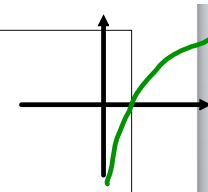
Phase Shift  $(-c/b)$  11.86

Raised: (d) 159.17

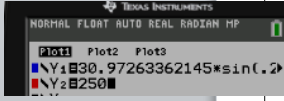
$y = a \sin(bx + c) + d$   
 $a = 30.97263362$   
 $b = .2416609734$   
 $c = 2.866510018$   
 $d = 159.1791207$

SinReg  
 Iterations: 1  
 Xlist: L1  
 Ylist: L2  
 Period: 26  
 Store RegEQ: Y1  
 Calculate

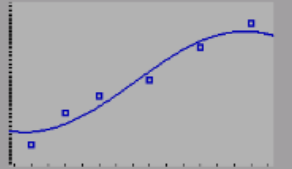
sinreg 1,L1,L2,26,Y1



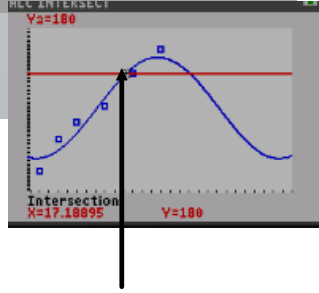
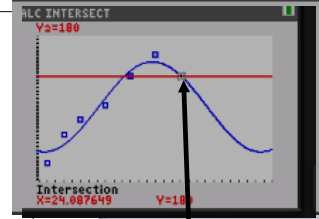
Amplitude: (a) \_\_\_\_\_  
 Period: (2π/b) \_\_\_\_\_  
 Phase Shift (-c/b) \_\_\_\_\_  
 Raised: (d) \_\_\_\_\_



Did the student find all the solutions to a regression value just above or below the extrema?



value desired: (y2=) 180lbs      Period: 26  
 distinct solutions: (intersection method) s1: 17.18      s2: 24.08  
 all solutions: 17+26n (add n\*period to s1)  
                   24+26n (add n\*period to s2)



According to the sine regression, I should weigh 180lbs  
 at 17yrs, 24yrs, 43yrs, 50yrs, 69yrs 76