

$$\lim_{x \rightarrow 9} \boxed{\text{reg E1}} = 666.41$$

Substitution

$$\int \frac{\sin(\text{crap})}{\sin(u)} \cdot \frac{\text{crap}' dx}{du}$$

Chain
Rule

$$\frac{d}{dx} \sin(\text{crap}) = \cos(\text{crap}) \cdot \text{crap}'$$

$$u = \text{crap} \\ du = \text{crap}' dx$$

$$\int \sin(u) du = \cos u + C \\ = \cos(\text{crap}) + C$$

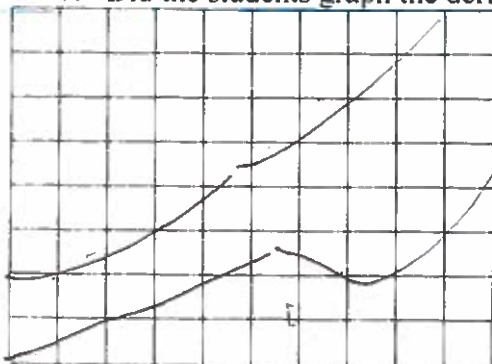
Limit $x \rightarrow \infty$: ∞ as limit:

$$\lim_{x \rightarrow \infty} r(x) = \infty$$

Limit $x \rightarrow -\infty$: $-\infty$ as limit:

$$\lim_{x \rightarrow -\infty} r(x) = -\infty$$

7. Did the students graph the derivatives of the split regression? ($y_3 = \text{nderiv}(y_1, x, x)$, $y_4 = \text{nderiv}(y_2, x, x)$)



Not differentiable

Where derivatives found at each data point from the split regression?

$$y_3 = \text{nderiv}(y_1, x, x)$$

$$y_4 = \text{nderiv}(y_2, x, x)$$

8. Did the student find the derivatives of the exponential, logarithmic, and sine regressions?

X:	5	6	7	8	9	10	11	12	13
Y' (expreg)	26.4	28	29	30	32	34	35	37	39
Y' (lnreg)	54	48	38	33	30	27	24	22	20
Y' (sinreg)									

9. Was the zero found by using Newton's Method for by using $x=0$ or $x=1$ as an initial guess?

Y1 = cubic regression

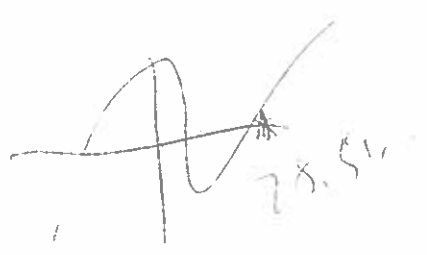
0 to x

$x - y_1 / \text{nderiv}(y_1, x, x)$ to x

iteration 10.1429

iteration -7.9685

iteration -7.7665



28.5679

zero:

10. Did the student use the mean value theorem on the two end points and identify a point on the graph with a similar slope?

28.52

Ave Rate of change: _____

Ave. $\frac{\Delta Y = 8^{2.3} - 9^{5.67}}{\Delta X = 13 - 4}$

Y1=regEq
Y2=nderiv(y1,x,x)
Y3="average rate of change"
Calc 5:intersect

Points of intersection: x= 7.45 , 28.52

11. Did the student find the correlations for all the regressions? (see #4) ✓

Did the student use differentials to identify the error in some prediction?

Y1= regression or derivative
dx=error in measuring x value (± 0.5 *last sig fig)
error $\sim f'(a)dx$

$\Delta x = \pm 0.5$

error $= f'(a) \cdot dx$
 $f'(13) = 37.525$

error $(37.525)(\pm 0.5)$
 ± 18.7625

12. Did the student use calculus to identify where the cubic regression is increasing/decreasing and where the Max/Mins are?

Find $y' = 0$ to identify critical values a1,a2

$y = Ax^3 + Bx^2 + Cx + D$
 $y' = 3Ax^2 + Bx + C = 0$

812.39 ± 18.7625

Find $y''(a1)$ and $y''(a2)$ to determine max/min

$y'' = 6Ax + B$

$x = \frac{-B \pm \sqrt{B^2 - 12AC}}{6A}$

in 2013
using cubic regression

List Maximums: _____

List Minimums: _____

Increasing (between min and max): _____

Decreasing (between Max and min): _____