<u>AGENDA</u>

QUIZ REVIEW

INTEGRATION WITH SUBSTITIUTION

PROJECT

$\boxed{y = 20x^{4/3} + 7x^{1/3}}$ $\boxed{\text{Concave}}$ (y'')

$\boxed{y'} = \frac{80}{3}x^{1/3} + \frac{7}{3}x^{-2/3}$

$\frac{1}{3} - \frac{3}{3} = -\frac{2}{3}$

$\boxed{y''} = \frac{80}{9}x^{-2/3} - \frac{14}{9}x^{-5/3}$

$-\frac{2}{3} - \frac{3}{3} = -\frac{5}{3}$

$\boxed{\text{Factor}}$

$y'' = \frac{2}{9}x^{-5/3}(40x^{1} - 7)$

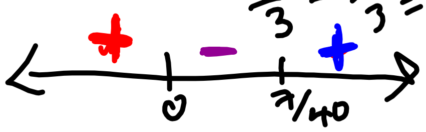
$1 = \frac{3}{3}$

$x^{3/3} \cdot x^{-5/3} = x^{-2/3}$

$\frac{3}{3} - \frac{5}{3} = -\frac{2}{3}$

$x = 0$ $\qquad$ $x = 0$

UND: $x = 0$ $\qquad$ $7/40$

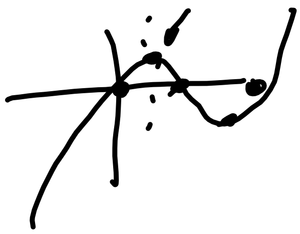


Concave Up $x > \boxed{7/40}$ $\quad x < \boxed{0}$

Concave down $\boxed{0} < x < \boxed{7/40}$

A sheet of paper 70 cm-by-64 cm is made into an open box (i.e. there's no top), by cutting x-cm squares out of each corner and folding up the sides. Find the value of x that maximizes the volume of the box. Give your answer in the simplified radical form.

x = ☐ **is the max.**



$$V = (70-2x)(64-2x)x$$

$$V = x(4480 - 128x - 140x + 4 \cdot x^2)$$

$$V = 4x^3 - 268x^2 + 4480x$$

$$0 = 12x^2 - 536x + 4480 = V'$$

$$0 = 3x^2 - 134x + 1120$$

$$x = \frac{134 \pm \sqrt{134^2 - 4 \cdot 3 \cdot 1120}}{6}$$

$$x = \frac{134 - \sqrt{4516}}{6}$$

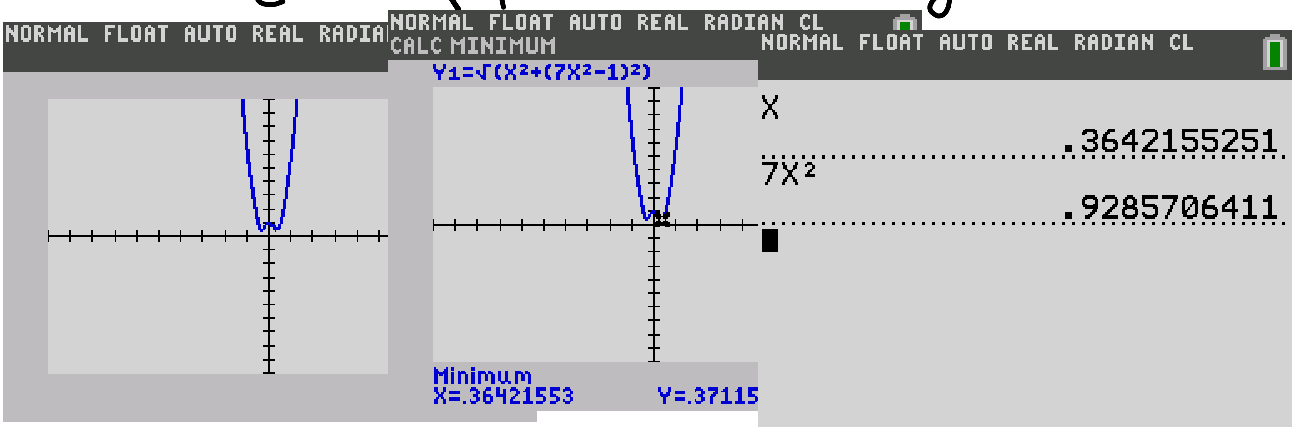
$$\frac{67}{3} - \frac{\sqrt{1129}}{3}$$

$$\frac{67}{3} = 22\tfrac{1}{3}$$

Find the points on the curve $y = 7x^2$ closest to the point (0, 1).

-(.3642 , .9286) and (.3642 , .9286) (x, y) $(0,1)$

$$d = \sqrt{(x-0)^2 + (y-1)^2}$$



Step $\begin{array}{r} 1.07 \\ -\ .97 \\ \hline .1 \end{array}$

Sum the values of $f(x) = 2x^2 - 5x + 4$ evaluated at $x = 0.97$, $x = 1.07$, $x = 1.17$, … , $x = 2.77$.

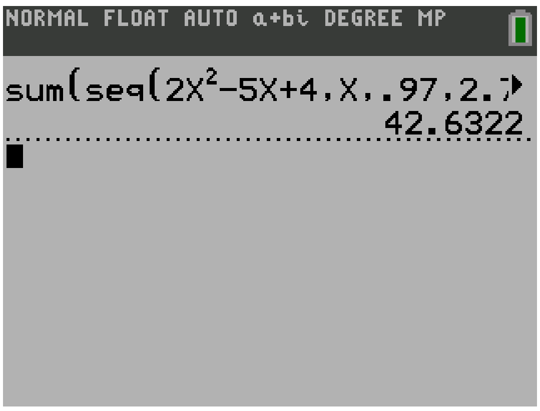
$$f(.97) + f(1.07) + f(1.17) + \dots + f(2.77)$$

$f(1.27)$

$$\text{sum}(\text{seq}(2x^2 - 5x + 4, x, .97, 2.77, .1)) = \boxed{42.6322}$$

$\begin{array}{r} 2.77 \text{ last} \\ -\ .97 \text{ first} \\ \hline 1.8 \end{array}$

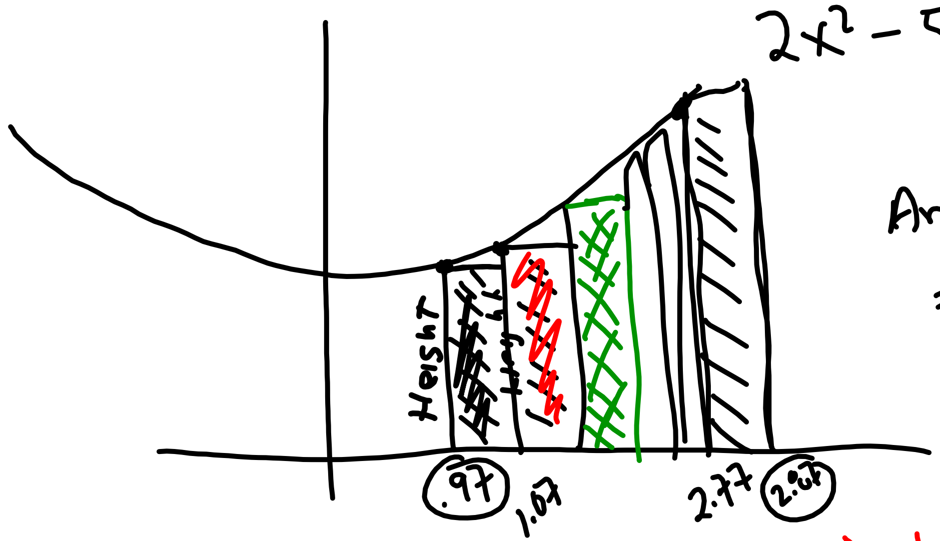
$\dfrac{1.8}{.1} = \cancel{18}$ 19



0) $1 + 2 + 3$)

$\begin{array}{r} 3 \\ -1 \\ \hline \cancel{2} \end{array}$ 3

$2x^2 - 5x + 4$



Area = Height · width

$= f(x) \cdot \text{step}$

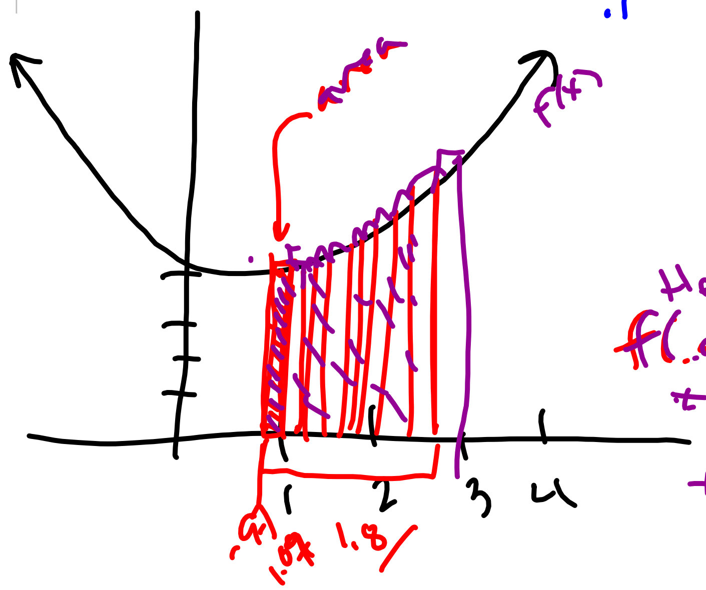
$f(.97) \cdot .1 + f(1.07) \cdot .1 + f(1.17) \cdot .1$

Approx Area under curve $\approx .1\left[f(.97) + f(1.07) + \ldots f(2.77)\right]$

$(.1)(42.6) = 4.26$

Sum the values of $f(x) = 2x^2 - 5x + 4$ evaluated at $x = 0.97$, $x = 1.07$, $x = 1.17$, … , $x = 2.77$.

.1



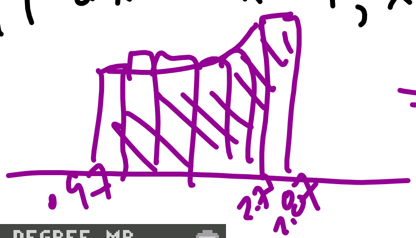
$$\begin{array}{r} 2.77 \\ -\ .97 \\ \hline 1.8 \end{array}$$

$\frac{1.8}{.1} = 18 + 1$

Height

$f(.97)(.1)$ width $+ f(1.07)(.1) + \ldots + f(2.77)(.1)$

Sum(seq($2x^2 - 5x + 4$, x, .97, 2.77, .1))(.1)



= 4.263

sum

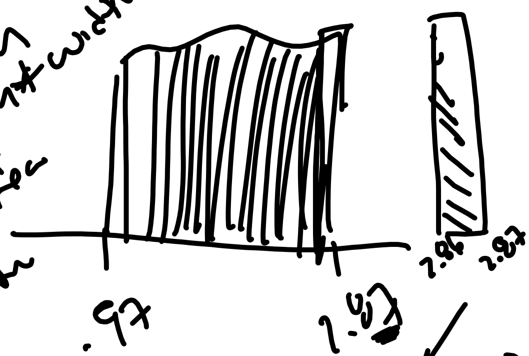
sum * width ≈ area of rects

```
NORMAL FLOAT AUTO a+bi DEGREE MP
                               42.6322
Ans*.1
                               4.26322
∫(.97 to 2.87) (2X²-5X+4)dX
                           4.511486667
sum(seq(2X²-5X+4,X,.97,2.8
                               4.48609
NORMAL FLOAT AUTO a+bi DEGREE MP
sum(seq(2X²-5X+4,X,.97,2.8
                             4.4987725
```

Exact area

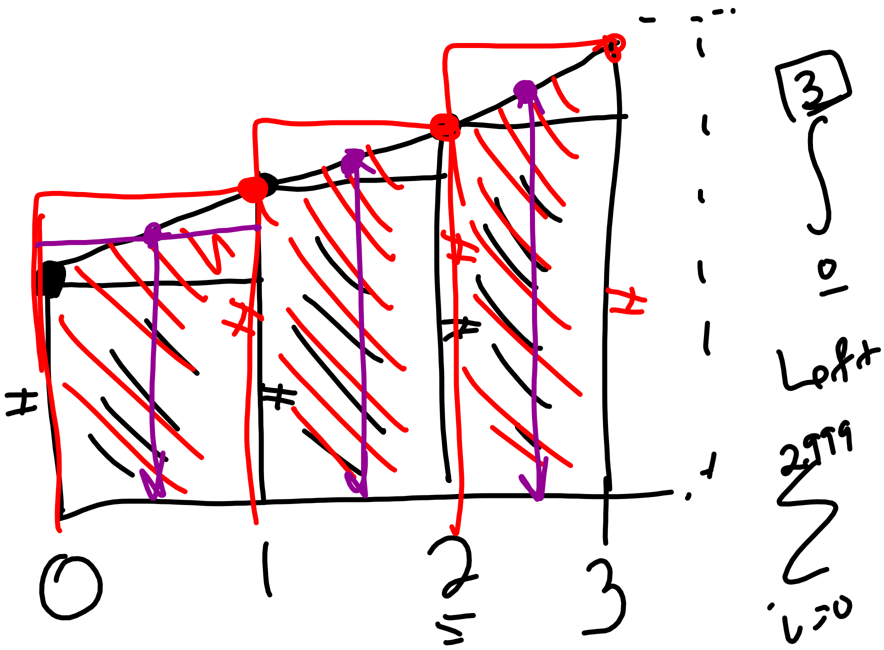
190 rects

900 rects

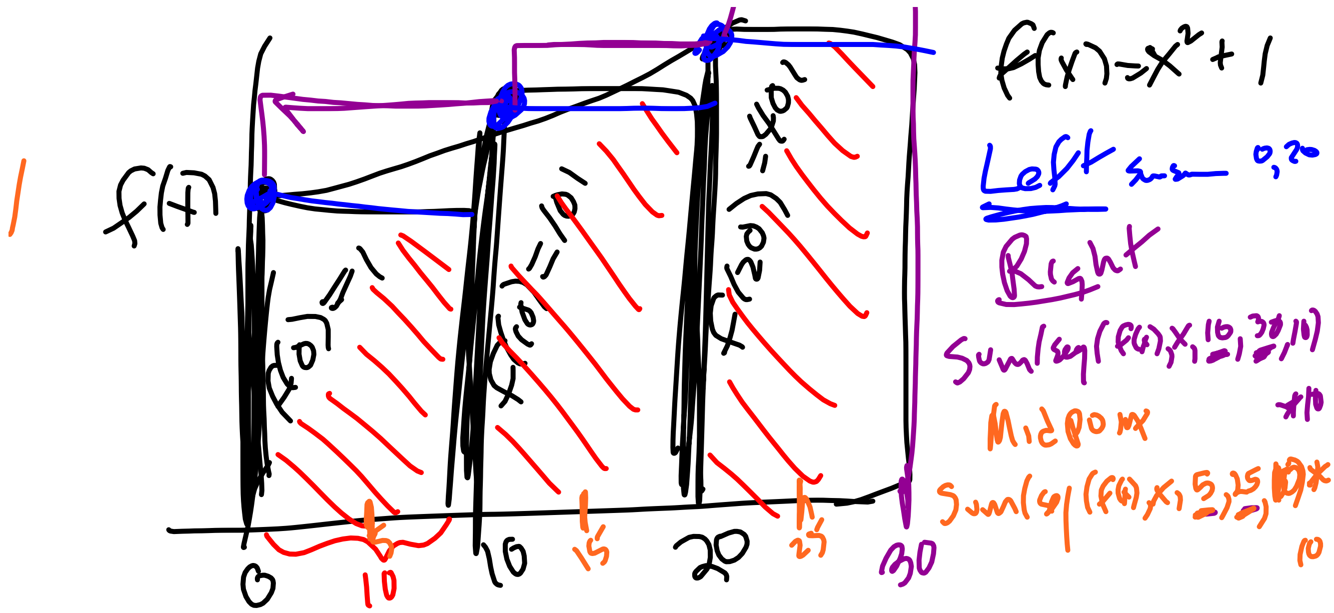


Sum(seq(—, x, .97, 2.86, .01)(.01)

Sum(seq(— x, .97, 2.865, .005)(.005)



0
1
2
3
Left
2999
i=0



Area= 1x(10)+ 101x(10)+ 401x(10)

Sum(Seq(f(x),X,0,20,10)*10 = width

Sum the values of $f(x) = 2x^2 - 5x + 4$ evaluated at $x = 0.97$, $x = 1.07$, $x = 1.17$, … , $x = 2.77$.

$$\begin{array}{r} 1.07 \\ -.97 \\ \hline .1 \end{array}$$

$$\text{sum}(\text{seq}(\underline{2x^2 - 5x + 4}, X, .97, 2.77, .1))$$

$$= \cancel{80.6322}$$

$$342.63$$

$$\int_{.97}^{2.77} 2x^2 - 5x + 4 \, dx = \cancel{8}3.93$$

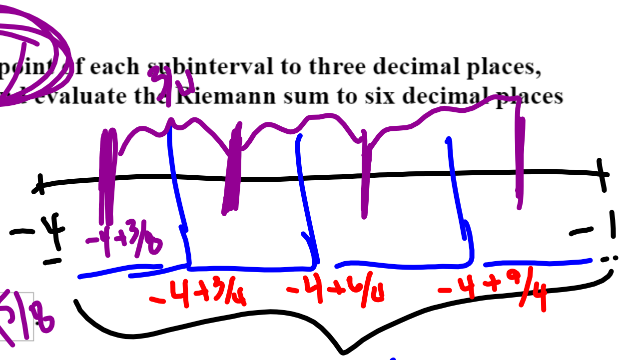
$$\times .1$$

$$= 4.263$$

Be sure to answer all parts.

List the evaluation points corresponding to the midpoint of each subinterval to three decimal places, sketch the function and approximating rectangles and evaluate the Riemann sum to six decimal places if needed.

$f(x) = x^2 + 7$, $\boxed{[-4, -1]}$, $\boxed{n = 4.}$



Give your answer in an ascending order.

Evaluation points: $-4+3/8$, $-2\,7/8$, $-2\,1/8$ and $-1\,5/8$

$-3\,5/8$ $+6/8$ $+6/8$

$+6/8$

$-4+0$ $-4+3/4$

$-4+3/8$

Be sure to answer all parts.

List the evaluation points corresponding to the midpoint of each subinterval to three decimal places, sketch the function and approximating rectangles and evaluate the Riemann sum to six decimal places if needed.

$f(x) = x^2 + 7$, $[-4, -1]$, $n = 4$.

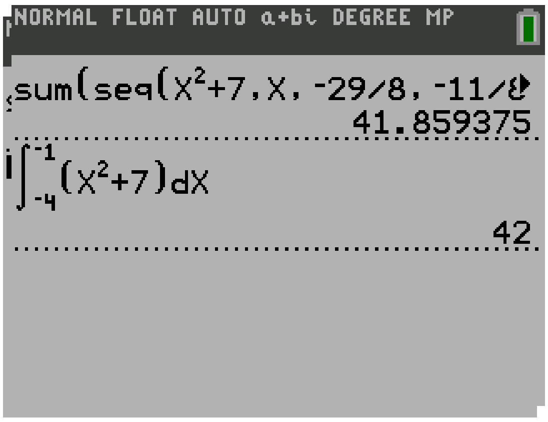
Give your answer in an ascending order.

Evaluation points: ___ , ___ , ___ **and** ___ .

Area =

Sum(seq(x^2+7, X, $-3\frac{5}{8}$, $-1\frac{3}{8}$, $\frac{3}{4}$))

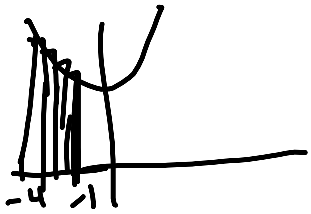
3/4



Be sure to answer all parts.

List the evaluation points corresponding to the midpoint of each subinterval to three decimal places, sketch the function and approximating rectangles and evaluate the Riemann sum to six decimal places if needed.

$f(x) = x^2 + 7$, $[-4, -1]$, $\boxed{n = 4.}$



Give your answer in an ascending order.

Evaluation points: $-3\frac{5}{8}$, $-2\frac{7}{8}$, $-2\frac{1}{8}$ **and** $-1\frac{3}{8}$.

$-4 \quad -1$

$3/4$

$\text{sum}(\text{seq}(X^2+7, X, -3\frac{5}{8}, -1\frac{3}{8}, 3/4)) \cdot 3/4$

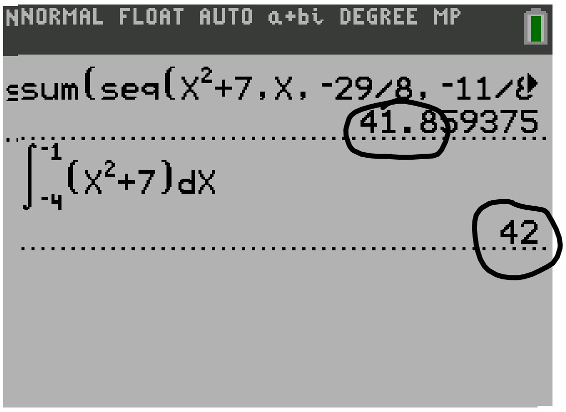
$=$

$-4+0 : -4+3/4$

$-4+3/8 = -3\,5/8 \quad + \; 6/8 = -2\,7/8$

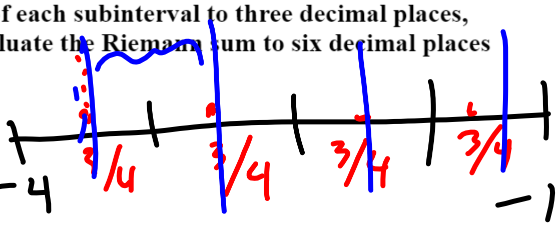
Approx with rectangles

exact area



Be sure to answer all parts.

List the evaluation points corresponding to the midpoint of each subinterval to three decimal places, sketch the function and approximating rectangles and evaluate the Riemann sum to six decimal places if needed.



$f(x) = x^2 + 7$, $[-4, -1]$, $n = 4$.

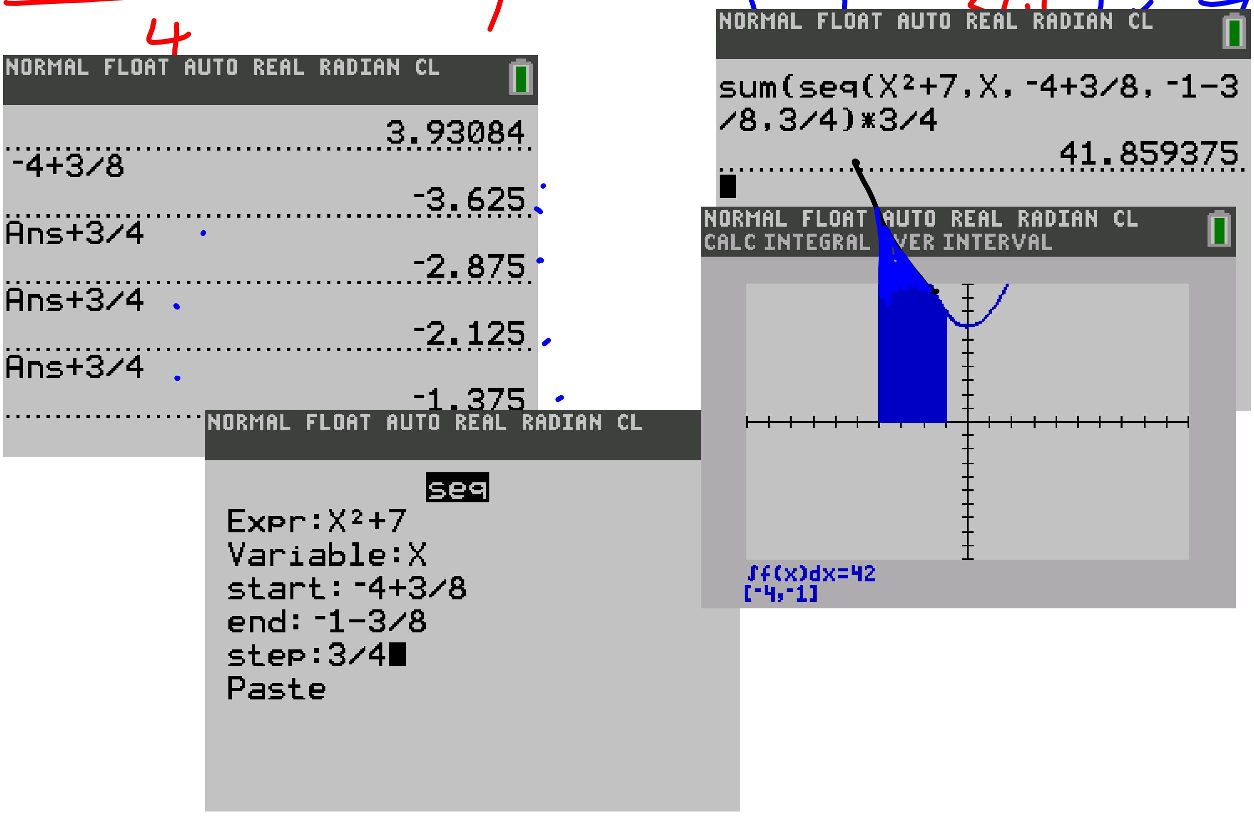
Give your answer in an ascending order.

$-4 + \frac{3}{8}$ $+\frac{3}{4}$ $+\frac{3}{4}$ $+\frac{3}{4}$

Evaluation points: −3.625 , −2.875 , −2.125 **and** −1.375 .

$$\frac{-4 + +1}{4} = \frac{-3}{4}$$

−4 8 −1



$f(x) = \underline{x^2+7}$

$f(-4) = 16+7$
$= 23$

$f(-1) = 1+7$
$= 8$

Sum the values of $f(x) = 4x^2 - 3x + 7$ evaluated at $x = 1.18$, $x = 1.28$, $x = 1.38$, . . . , $x = 2.58$.

1.08

sum(seq(4x²-3x+7, x, 1.18, 2.58, .1))

$$\sum_{i=1}^{15} 4(1.08 + .1i)^2 - 3(1.08 + .1i) + 7$$

$i = 1 \rightarrow 1.08 + .1 = 1.18$

$i = 15 \rightarrow 1.08 + 1.5 = 2.58$

$$\begin{array}{r} 2.58 \\ -\ 1.18 \\ \hline 1.4 \end{array}$$

$\frac{1.4}{.1} = 14$, $+1$

Sum the values of $f(x) = \boxed{4x^2} - \boxed{3x} + \boxed{7}$ evaluated at $x = 1.18$, $x = 1.28$, $x = 1.38, \ldots,$ $x = 2.58$.

1.08

.1

sum(seq(4x²-3x+7, x, 1.18, 2.58, .1)) =

= 243.6

$$\sum_{i=\boxed{1}}^{15} 4(\underline{1.08+.1i})^2 - 3(1.08+.1i)+7$$

$\boxed{i=1}$ $\quad 1.08+.1 = \boxed{1.18}$

$i=15 \quad 1.08+.1(15) = 2.58$

$i=n \quad 1.08+.1n = 2.58$

$$\begin{array}{r} 2.58 \\ -\ 1.08 \\ \hline 1.5 \end{array}$$

$.1n = 1.5$

$\frac{1.4}{.1} = 14$

$n = 15$

$1 + 2 + 3$

$\sum_{i=1}^{3}$

$$\begin{array}{r} 3 \\ -\ 1 \\ \hline 2 \end{array}$$

15

1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2.0
2.1
2.2
2.3

Sum the values of $f(x) = 4x^2 - 3x + 7$ evaluated at $x = 1.18$, $x = 1.28$, $x = 1.38$, . . . , $x = 2.58$.

Sum(seq($4x^2-3x+7$, X, 1.18, 2.58, .1)) $= 243.66$

$$\begin{array}{r} 1.28 \\ -1.18 \\ \hline .1 \end{array}$$

$$\begin{array}{r} 1.18 \\ -.1 \\ \hline 1.08 \end{array}$$

$$\sum_{i=1}^{15} 4(1.08 + .1i)^2 - 3(1.08 + .1i) + 7$$

1.18

$1.08 + 1.50 = 2.58$

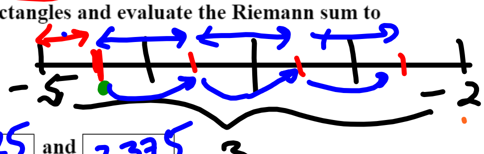
$$\begin{array}{r} 2.58 \\ -1.18 \\ \hline 1.40 \end{array}$$

List the evaluation points corresponding to the midpoint of each subinterval to three decima places, sketch the function and approximating rectangles and evaluate the Riemann sum to six decimal places if needed.

$f(x) = x^2 + 5$, $[-5, -2]$, $n = 4$

Give your answer in an ascending order.

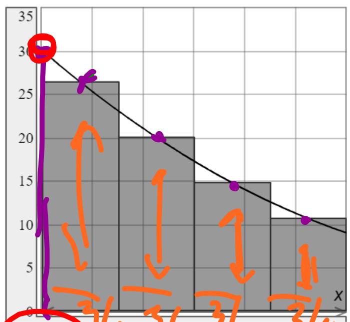
Evaluation points: -4.625, -3.875, -3.125 and -2.375



$\Delta x = 3/4$

$\frac{3/4}{2} = 3/8$

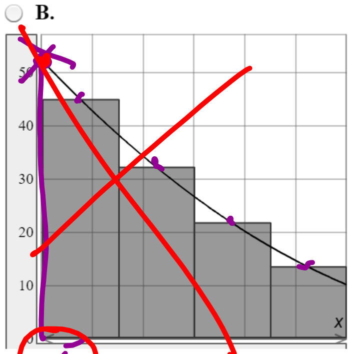
A.



-5 $3/4$ $3/4$ $3/4$ $3/4$

$f(-5) = (-5)^2 + 5 = 30$

B.



$-5 + 3/8 = -4.625$

$-4.625 + 3/4 = -3.875$

$-3.875 + 3/4 = -3.125$

$-3.125 + 3/4 = -2.375$

sum(seq(x^2+5, x, -4.625, -2.375, .75)) * .75

= 53.85...

step

Question

List the evaluation points corresponding to the midpoint of each subinterval to three decima places, sketch the function and approximating rectangles and evaluate the Riemann sum to six decimal places if needed.

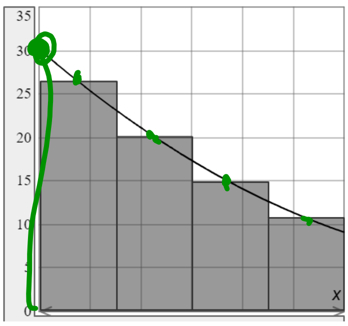
$f(x) = x^2 + 5$, $[-5, -2]$, $n = 4$.

Give your answer in an ascending order.

Evaluation points: -4.625, -3.875, -3.125 **and** -2.375.

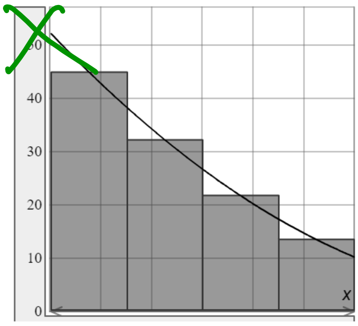
$+.75$ $+.75$ $+.75$

A.



-5

B.



-5

$\frac{3}{8}$

-5 $\frac{3}{4}$ $\frac{3}{4}$ $\frac{3}{4}$ $\frac{3}{4}$ -2

$\underbrace{\qquad\qquad}_{3|4}$

$-5 + \frac{3}{8}$

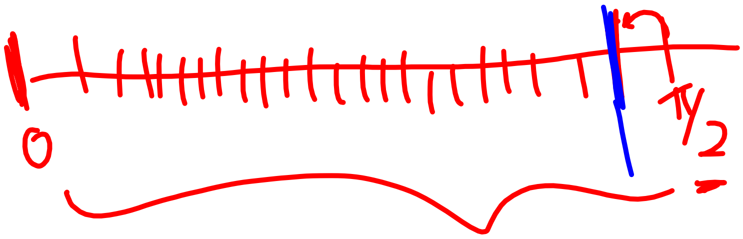
$-4\frac{5}{8} + \frac{3}{4}$

sum(seq(x^2+5,x,-4.625,-2.375,.75))*.75=

Approximate the area under the curve on the given interval using n rectangles and the evaluation rules for the left endpoint. Round your answer to four decimal places if needed.

$y = 4\cos x$ on $[0, \pi/2]$, $n = 48$

Your Answer:



$$\frac{\pi/2}{48} = \frac{\pi}{96}$$

Start at 0

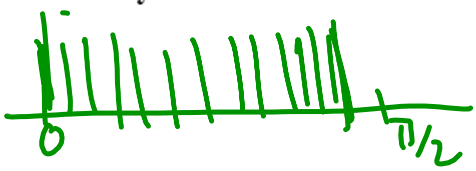
$$\frac{\pi}{2} - \frac{\pi}{96}$$

```
sum(seq(4cos(X),X,0,π/2-π▸
                6.282422673
∫_0^{π/2} (4cos(X))dX
                6.282398249
```

Approximate the area under the curve on the given interval using n rectangles and the evaluation rules for the left endpoint. Round your answer to four decimal places if needed.

$y = 4\cos x$ on $[0, \pi/2]$, $n = 48$

Your Answer:



sum(seq(4cosx, x, 0, π/2 − π/96, π/96)) * π/96

$$\frac{\frac{\pi}{2}}{48} = \frac{\pi}{96}$$

Compute the sum.

$$\sum_{i=3}^{6} (3i^2 + i) = \boxed{}$$

$$3\sum_{i=3}^{6} i^2 + \sum_{i=3}^{6} i$$

$9 = 27 + 3 = 30$

$$3 \cdot 3^2 + 3 + 3 \cdot 4^2 + 4 + 3 \cdot 5^2 + 5 + 3 \cdot 6^2 + 6$$

30 52 80 114

$= 276$

$$\sum_{i=1}^{n} i^2 = \frac{n\cdot(n+1)(2n+1)}{6}$$

$$\sum_{i=1}^{6} i^2 = \frac{6\cdot 7\cdot 13}{6} = 7\cdot 13 = 91$$

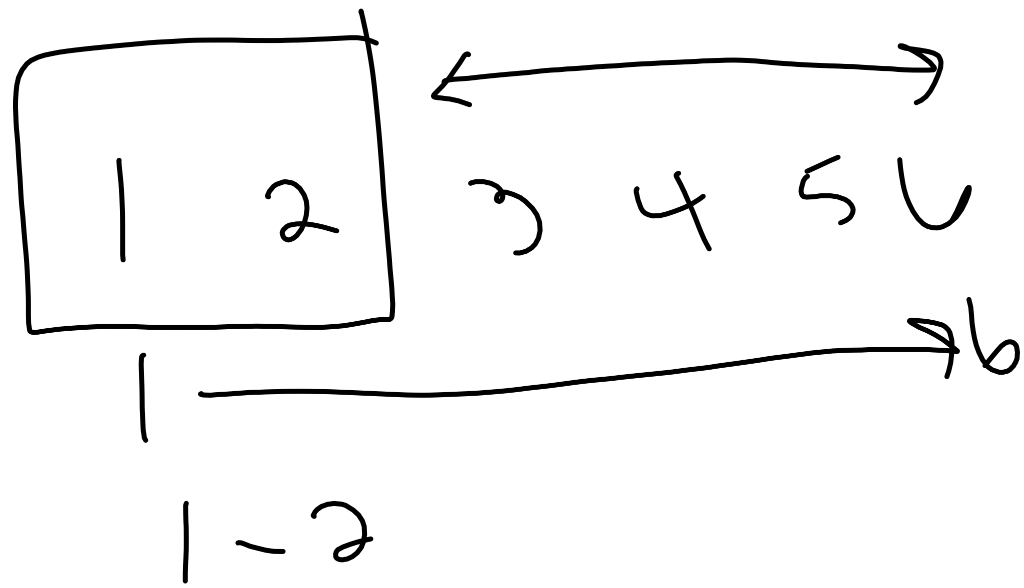
$$\sum_{i=1}^{2} i^2 = 1+4 = 5$$

$$\sum_{i=3}^{6} i^2 = 91-5 = 86$$

$$3\sum_{i=3}^{6} i^2 = 3\cdot 86 = 258 \qquad 258$$

$$\sum_{i=3}^{6} i = 3+4+5+6 = 18$$

$$276$$


1 2 3 4 5 6
1 6
1~2

Compute the sum.

$$\sum_{i=3}^{6} (3i^2 + i) = \boxed{}$$

3, 4, 5, 6

sum(seq(3X² + X, X, 3, 6, 1)) = 276

$$3\sum_{i=3}^{6} i^2 + \sum_{i=3}^{6} i =$$

$$3\sum_{i=1}^{6} i^2 - 3\sum_{i=1}^{2} i^2 \quad \text{or} \quad 3(3^2+4^2+5^2+6^2)$$

$$\sum_{i=n}^{729} i^2 = \frac{n(n+1)(2n+1)}{6}$$

start with $i = 1$ only

$$\sum_{1}^{729} i - \sum_{1}^{255} i$$

LECTURE: Substitution

$$F(x) = \int f(x)\,dx$$

Indefinite Integral

Definite Integral

Area under curve

$$\int_{\boxed{a}}^{\boxed{b}} f(x)\,dx = F(b) - F(a)$$

$\boxed{\text{F.T.C}}$

Math = Langage

Calculus = Study of Change

Instantaneous Rate = derivate.

Anti derivate = indefinite integral

$$\int f(x)\,dx = F(x) + c$$

Fundamental Theorem

Definite Integral $\int_a^b f(x)\,dx = F(b) - F(a)$

Area under
f(x) between a & b

Undoing Chain Rule.

$$\frac{d}{dx}\left[e^{x^2}\right] = \left[e^{x^2}\right] 2x$$

$$\boxed{\int e^{\boxed{x^2}} \cdot 2x \, dx} =$$

inside function $= x^2 = u$

$du = 2x\,dx$

Substitution

$$\int e^u \, du = e^u + c$$

$$\boxed{e^{x^2} + c}$$

Substitution

1. identify inside function
   - in parenthesis
   - in exponent
   - in radical
   - in denominator
2. Take differential
3. Do substitutions
4. Evaluate
5. Back substitute

Ex. $\int \cos(x^3) \cdot 3x^2\,dx$

$u = x^3$

$du = 3x^2\,dx$

$= \int \cos(u)\,du = \sin u + C$

$= \sin x^3 + C$

Ex

$$\int (x^2+5)^{100}\, x\,dx$$

$$u = x^2+5$$

$$\frac{du}{2} = \frac{2x\,dx}{2}$$

$$\int u^{100} dn$$

$$\int u^{100} \cdot \frac{du}{2} = \frac{1}{2}\,\frac{u^{101}}{101} + C$$

$$= \frac{1}{202}(x^2+5)^{101} + C$$

Ex $\int \frac{1}{1+x^2}\,dx = \tan^{-1}(x)+C$

Ex $\int \frac{x}{1+x^2}\,dx = \int \frac{1}{u}\,\frac{du}{2}$

$d(1+x^2) = 2x\,dx$

$u = 1+x^2$

$\frac{du}{2} = \frac{2x\,dx}{2}$

$= \frac{1}{2}\int \frac{1}{u}\,du$

$= \frac{1}{2}\ln|u|+C$

$\boxed{= \frac{1}{2}\ln|1+x^2|+C}$

Check $\frac{1}{\cancel{2}}\cdot\frac{1}{1+x^2}\cdot\cancel{2}x$

$$\boxed{\int \frac{x^2}{1+x^2}\,dx} = \int \left(1 - \frac{1}{x^2+1}\right) dx = x - \tan^{-1}(x) + C$$

$$\begin{array}{r} 1 - \frac{1}{x^2+1} \\ x^2 + 1 \overline{\big)\, x^2 + 0x + 0} \\ -(x^2 \quad\quad +1) \\ \hline -1 \end{array}$$

Long division

Ex $\boxed{\int \frac{x^3}{x^2+1}} dx = \int x - \frac{x}{x^2+1} dx = x^2 - \frac{1}{2} \ln|x^2+1| +$

$$\begin{array}{r} x \quad - \frac{x}{x^2+1} \\ x^2+1 \overline{\big)\, x^3 + \qquad} \\ -(x^3 \qquad + x) \\ \hline -x \end{array}$$

Long division + Substitute

$$\int \frac{1}{1+x^2}\,dx = \tan^{-1}(x) + c$$

$$\int \frac{x}{1+x^2}\,dx = \int \frac{1}{u}\,\frac{du}{2}$$

$$= \frac{1}{2}\int \frac{1}{u}\,du$$

U substitution

$u = 1 + x^2$

$du = 2x\,dx$

$du/2 = x\,dx$

$$= \frac{1}{2}\ln|u| + c$$

$$= \frac{1}{2}\ln(1+x^2) + c$$

$$\int \frac{x^2}{1+x^2}\,dx = \int 1 - \frac{1}{x^2+1}\,dx$$

$$1 - \frac{1}{x^2+1}$$

$$x^2+1 \,\overline{\big)\, x^2 + 0x + 0}$$

$$\underline{-(x^2 \qquad + 1)}$$

$$-1$$

$$= x - \tan^{-1}(x) + c$$

Very different

$$\int \frac{1}{1+x^2}\,dx$$

$$\int \frac{x}{1+x^2}\,dx$$

$$\int \frac{x^2}{1+x^2}\,dx$$

$$\int \frac{x^3}{1+x^2}\,dx$$

CALC II

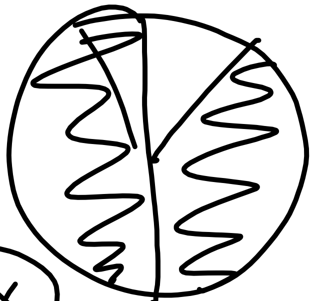
Sequences + Series

1, 2, 3, 4, ...

1+2+3+4 . . .

$$\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{5} \to \infty$$

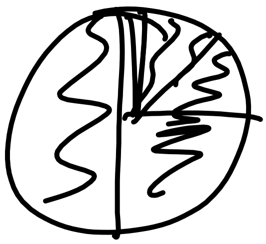
sin 45°



$$x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + = \sin x$$

3·2·1 5·4·3·2·1 7·6·5·…

$$1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} = \cos x$$



$$\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\frac{1}{16}+\dots = 1$$

sin	1	1.1	1.2	1.3
	✓	✓	✓	✓

Ex

$$\int \frac{\cos x}{\sqrt{\sin x}}\,dx = \int \frac{1}{\sqrt{u}}\,du$$

$$u = \sin x$$

$$du = \cos x\,dx$$

$$= \int u^{-1/2}\,du$$

Power rule.

$$\frac{u^{1/2}}{1/2} + C$$

$$\frac{(\sin x)^{1/2}}{1/2} + c$$

$$\int \frac{\cos x}{\sqrt{\sin x}}\,dx = \int \frac{1}{\sqrt{u}}\,du$$

$$= \int u^{-1/2}\,du$$

$u = \sin x$

$du = \cos x\,dx$

$$= \frac{u^{1/2}}{1/2} + C$$

$$= \boxed{2\sqrt{\sin x} + c}$$

Ex $\displaystyle\int \frac{2\sin x}{\sqrt{\cos x}}\,dx = \int \frac{2\cdot(-du)}{\sqrt{u}}$

$= -2\int u^{-1/2}\,du$

Substitution $u = \cos x$ $\qquad = -2\,\dfrac{u^{1/2}}{1/2} + c$

$du = -\sin x\,dx$

$-du = \sin x\,dx$ $\qquad = -4u^{1/2} + c$

$= -4(\cos x)^{1/2} + c = -4\sqrt{\cos x} + c$

PROJECT

Poster Mock-up

purpose: easy review of project by classmates

review: interesting, relevant, informative

when you review, you write on your own mock-up or separate paper.

1. Data as a list and its meaning and source
2. Plot of Data and Two or more regressions on the same graph ✓
3. Interesting prediction as a limits — $\lim_{x \to a}$
4. Relevant prediction of a derivative
5. Informative use of the integral and average value — y'
6. Picture of shaded area
7. Give an average rate of change ✓ — $\int f(x)dx$ Ave val
8. Predictions in words and a conclusion with your name.

Poster Mock-up must be reviewed by two classmates, and you must review two mockups. Be sure to comment if you think it is interesting, relevant, and informative.

✓ Prediction w/error. % error.

NAME:

Student

Data points:

X: Age	18	19	20	21	25	27	30	35	40
Y: Weigh	180	190	195	199	205	210	225	205	200

Description of X values: Age Units: Years

Description of Y values: Weight Units: lbs.

Source of the data: Scale.

www. propporla weyt .org

Why it is interesting:

ALL regressions calculated:

LinReg: a= .88 b= 177.9... r^2= .28...

QuadReg: a=_____ b=______ c=_______ r^2=_______

CubicReg: a=_____ b=______ c=_____ d=______ r^2=_______

QuartReg: a=_____ b=______ c=_____ d=______ e=_____ r^2=_______

ExpReg: a=_____ b=______ r^2=_______

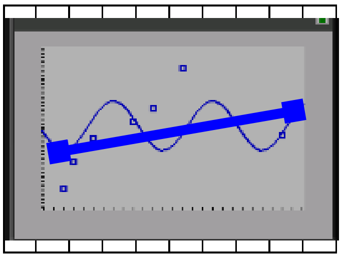
LnReg: a=_____ b=______ r^2=_______

SinReg*: a= 9.09... b= .624... c= -.289... d= 203.6...

*sin regression has a period of 10
Calculated with SinReg 1,L1,L2,# (where # is twice the distance from largest to smallest x value.)

$2\pi/B$

1. Plot of data and regression.



Regression used:	sine
First x (a)	18
Last x (b)	40

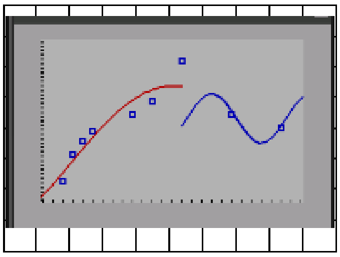
Average rate of change between the first and last x-values using regression

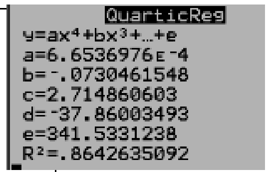
{Y(b)-Y(a)}/{b - a} $(Y_1(40)-Y_1(18))/(40-18)$ .2898128801	Average Rate of Change	.28lbs per year

Meaning:

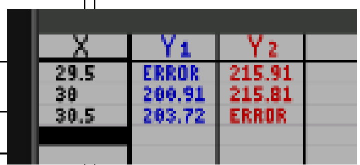
Between 18 and 40, my weight changed on average .28 lbs per year

2. The graph split into two regions with two different regressions on each side.



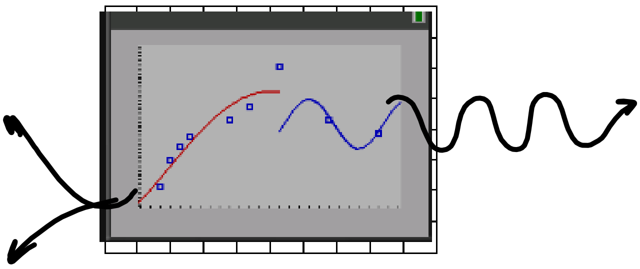


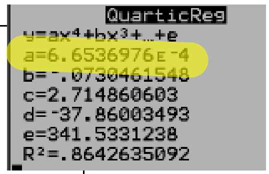
left regression split at a Y1=vars 5:>>1:RegEq /(x≤a) right regression Y2=vars 5:>>1:RegEq /(x≥a)	Left Regression used:	quartic
	Right Regression used:	sine
	Location of split (a)	30
Find Y1(a) Y2(a)	$\lim_{x\to a^-} r(x)$	215.81
	$\lim_{x\to a^+} r(x)$	200.91



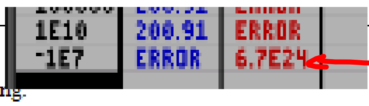
Meaning: As I grew to 30, I thought I would weight 216lbs (according to quartic regression).But as I look back from now, I think I should have weighed 201(from Sine regression)

3. The graph split into two regions with two different regressions on each side.





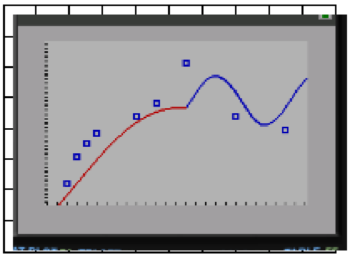
left regression split at a Y1=vars 5:> > 1:RegEq /(x≤a) right regression Y2=vars 5:> > 1:RegEq /(x≥a)	Left Regression used:	Quartic
	Right Regression used:	Sine
Find Y1(-9999) Y2(9999)	$\lim_{x\to-\infty} r(x)$	$+\infty$
	$\lim_{x\to+\infty} r(x)$	Undefined.



Meaning:

According to the sine regression, as time goes on, my weight will not approach anything. According to the quartic regression, it makes no sense to go back before the age of zero

5. The graph split into two regions with two different regressions on each side.

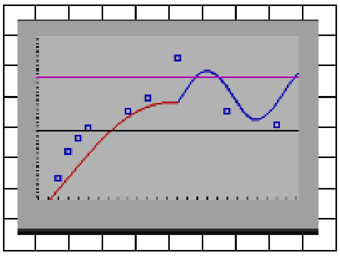


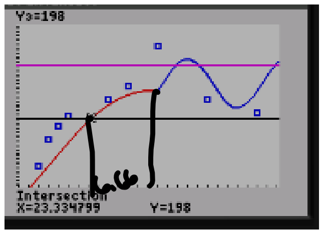
left regression split at a Y1=vars 5:>> 1:RegEq /(x≤a)+ adjust right regression Y2=vars 5:>> 1:RegEq /(x≥a)+ adjust	Left Regression used:	Quartic
	Right Regression used:	Sine
	Location of split (a)	30
Find Y1(a) Y2(a)	$\lim_{x \to a} r(x)$	208

Meaning:

According to this split regression, I expect to weight 208lbs at 30.

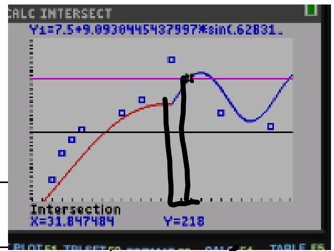
6. For a continuous regression: Given ε = small number Find δ > 0 that satisfies
Roughly adjust the regressions so the graph is continuous.
Plot data and graph the regressions. Label Axis.





30
−23.33
6.66

31.85
−30
1.85

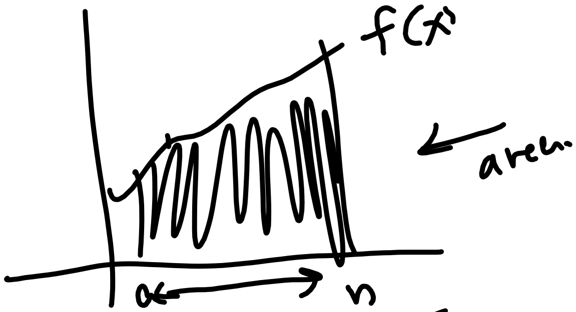


1.85

Y1(x)=regression (y2=split regression) Y3=L- ε Y4=L+ ε Calc 5:intersect y1 and y3 = x1 Calc 5:intersect y1(2) and y4 = x2 δ = ~~maximum~~ Min(|a-x1|,|a-x2|)	$\lim_{x \to a} r(x) = L$ $X \to 30$	208
	Given ε =	10
	Find δ =	1.85

Meaning: As long as my age is within 1.85 years of 30, my weight must be within 10 lbs of 208

$\boxed{\text{Today}}$



Approx with rectangles.

Y_1 = reg Eq.

$\text{Step} = \frac{b-a}{n} = \frac{b-a}{10} = \Delta$ Y_1 = reg Eq

rectangles   calc 7:

$\text{sum}(\text{seq}(Y_1, X, a, \underbrace{b-\Delta}_{\text{END}}, \Delta)) * \Delta = \square$

$\sum_{i=0}^{9} \text{reg}(a + \Delta i) = \square$

Words: According to regress, approximately ___ people/years between a & b is ___