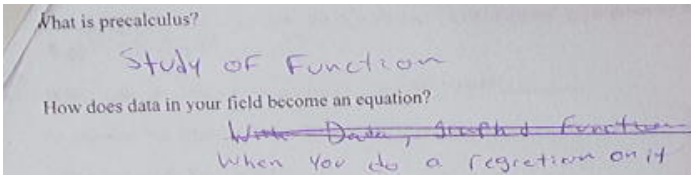
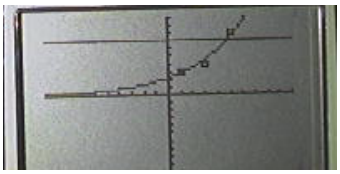

What is precalculus?

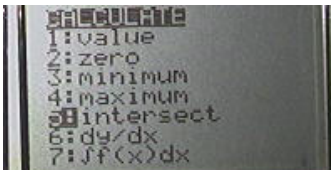
Study of Function

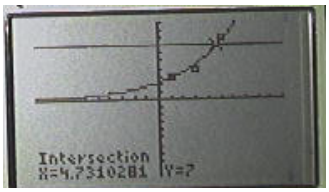
How does data in your field become an equation?

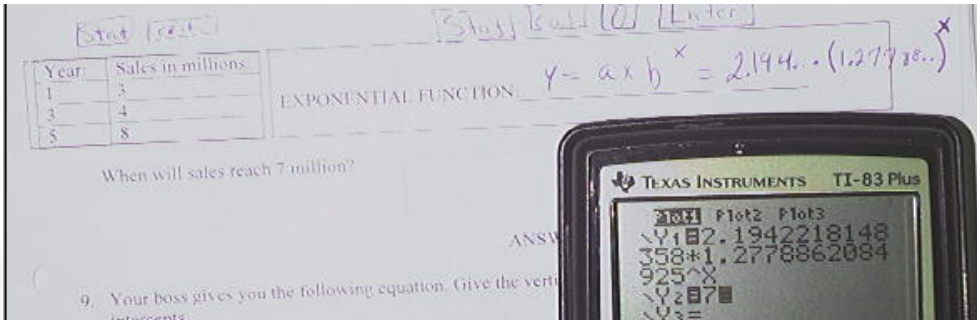
~~Make Data, Graph & Function~~

When you do a regression on it









When will sales reach 7 million?

Y_1 = Vars 5 > 2 enter

$Y_2 = 7$

Calc 5 intersect Enter Enter

ANSWER: 4.7310281

#9.

$S = \dfrac{100x(x-.01)}{(x-100)(x+100)}$

Horizontal Asymptote: $y = 100$

DN = DD = 2 ∴ HA = $\frac{LC}{LD}$ ... $\boxed{y = 100}$

Vertical Asymptotes

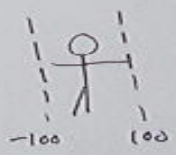
$\dfrac{100x(x-.01)}{(x-100)(x+100)}$

$x = 100$

$x = -100$

VA: 100 & −100

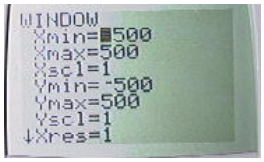
VA = zeros of the Dinom

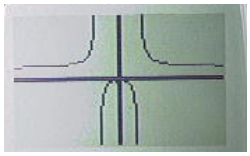


$S = \dfrac{100x^2 - x}{x^2 - 10,000} = \dfrac{100x(x-.01)}{(x-100)(x+100)}$

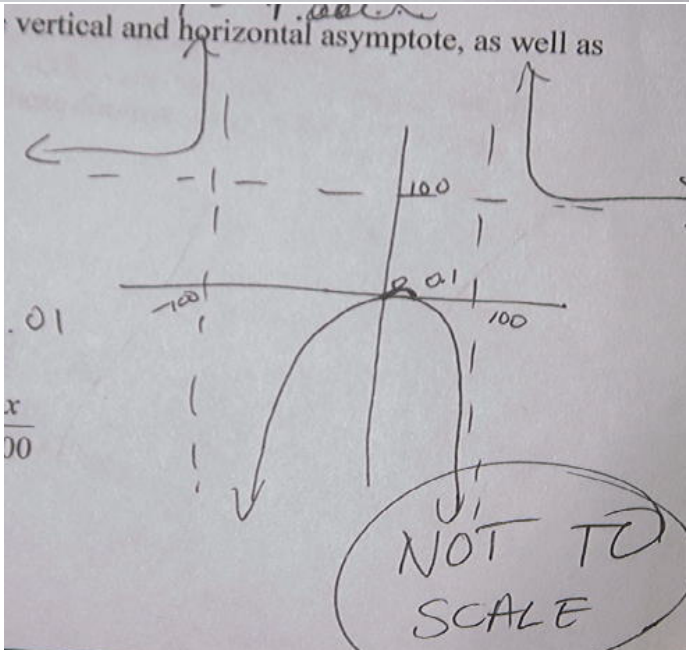
x-intercept = 0, .01 because

x-intercept = 0s of the numerator





vertical and horizontal asymptote, as well as



0.2 where does the graph cross through the x-axis?

$+1.25\times10^{-8}$

$R(p) = -250{,}000p^2(p-1.25\times10^{-8})$

↑ repeated once

Touches at $p=0$ because repeated twice

with a rate of 2.19% compounded continuously. With only these choices, what is the most amount of money you will have after 12 years?

① Fleet Bank

[MATH] [0] $0=P-Q(1+R/N)^{NT}$

P = *solver* [ALPHA] [ENTER] guess "0"

Q = 60,000

R = .022

N = 12 months

T = 12 yrs.

P = $78,108.81

After 12 yrs:

① Fleet Bank 2.2% = $78,108

Sovereign Bank 2.19% = 78033.9

ANSWER:

② Sovereign Bank

[MATH] [0] $0=P-Qe^{RT}$

P = *solver* [ALPHA] [ENTER] guess "0"

Q = 60,000

R = .0219

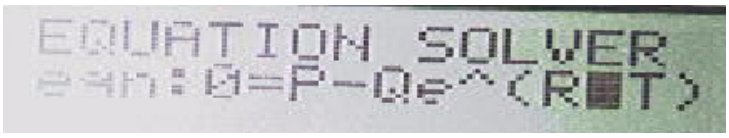
T = 12 yrs

P = $78033.99

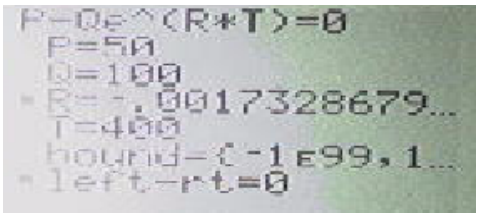
$R(p) = -250{,}000p^2(p-1.25\times10^{-8})$

degree: 3 ($2+1=3$)

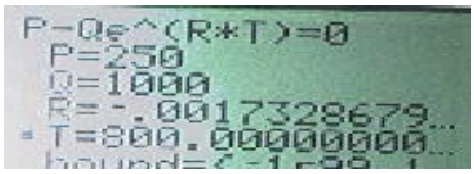
imaginary roots: 0, 2, 4.... not to exceed the degree of the polynomial



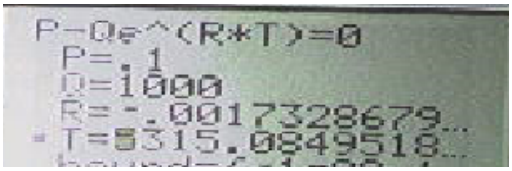
alpha enter



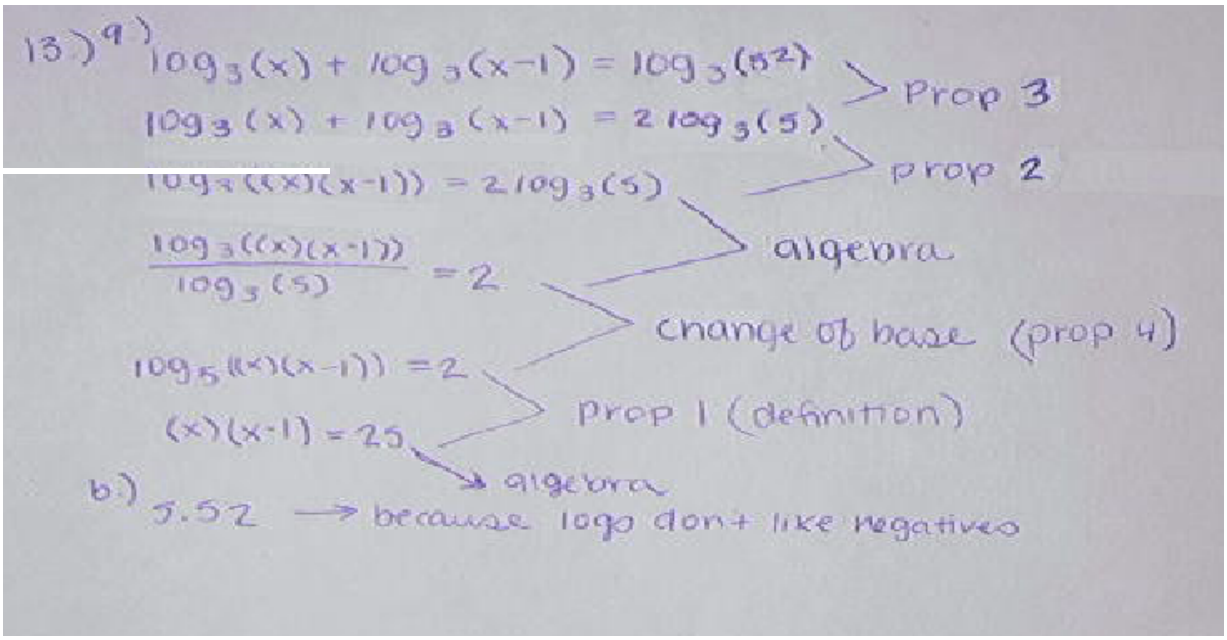
rate = -.17...%



800



5315...



Property 4: change of base (reverrse)

$$\frac{\log_b(A)}{\log_b(C)} = \log_C(A)$$

1. Choose the end behavior of the graph of each polynomial function.

(a) $f(x) = 2x^5 + 6x^3 - 5x - 3$

{(a) Rises, (b) Falls} to the left and
{(a) rises, (b) falls} to the right.

disco right LC+ degee:o

(b) $f(x) = 4x^4 - 2x^3 + 2x - 5$

{(a) Rises, (b) Falls} to the left and
{(a) rises, (b) falls} to the right.

happy parab

LC:4+ Degree:4(EVEN)

(c) $f(x) = -3x(x+1)(x-4)^2$

{(a) Rises, (b) Falls} to the left and
{(a) rises, (b) falls} to the right.

sad parabola

LC:-3 Degree:4 (even)

2. Divide.

$$(20x^3+16x^2+6x+6)\div(5x-1)$$

Your answer should give the quotient and the remainder.

Quotient: $4x^2+4x+2$

Remainder: 8

$$5x-1 \;\overline{)\; 20x^3+16x^2+6x+6}$$

$$4x^2+4x+2 \quad R8$$

$$-(20x^3-4x^2)$$

$$20x^2+6x$$

$$-(20x^2-4x)$$

$$10x+6$$

$$-(10x-2)$$

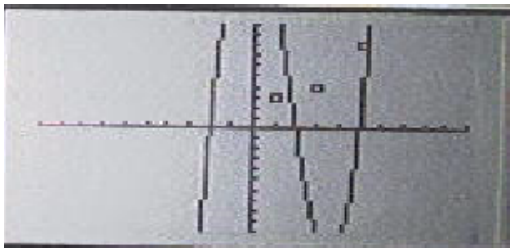
$$8$$

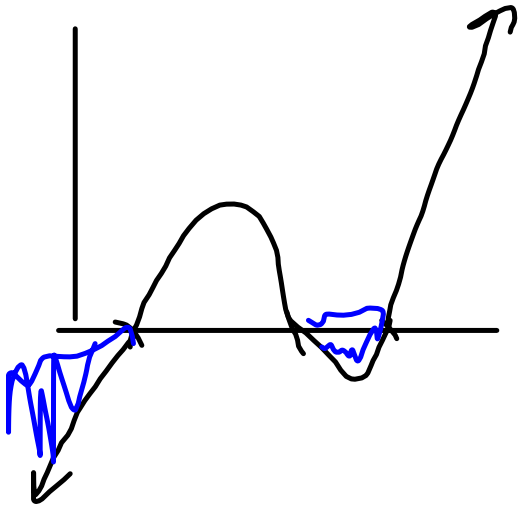
3. Solve the inequality.

$$x^3 - 5x^2 \geq 4x - 20$$

Write your answer as an interval or union of intervals.

y1=x^3-5x^2-4x+20





want mountains!

[-2,2]U[5,∞)

4. Suppose that the function f is defined on the interval $(-2, 2]$ as follows.

$$f(x) = \begin{cases} -1 & \text{if } -2 < x \leq -1 \\ 0 & \text{if } -1 < x \leq 0 \\ 1 & \text{if } 0 < x \leq 1 \\ 2 & \text{if } 1 < x \leq 2 \end{cases}$$

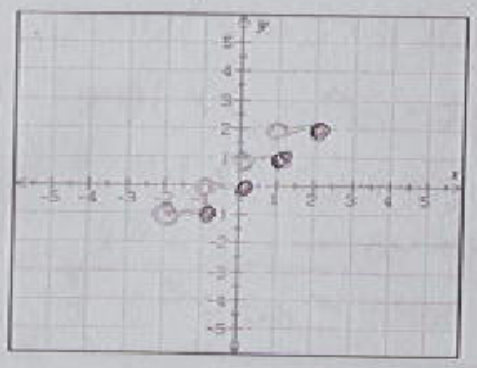
$\rightarrow (-2, -1]$

$\rightarrow (-1, 0]$

$\rightarrow (0, 1]$

$\rightarrow (1, 2]$

Graph the function f



5. Find all x-intercepts and y-intercepts of the graph of the function.

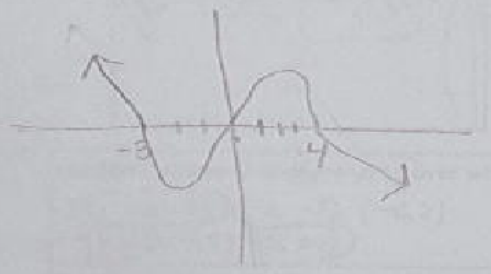
$$f(x) = -x^3 + x^2 + 12x$$

Degree: 3 (odd)
Lead: ⊖ negative
Disco left

If there is more than one answer, separate them with commas.

x-intercept(s): -3, 0, 4

y-intercept(s): 0



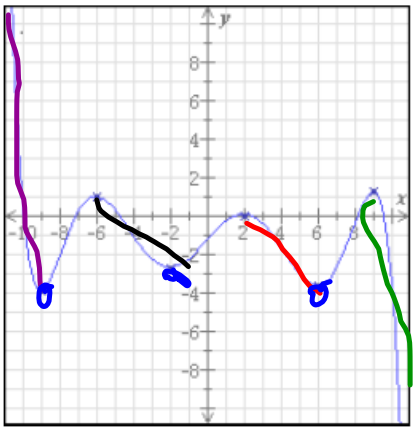
✓

$f(x) = -x(x^2 - x - 12)$

$f(x) = -x(x-4)(x+3)$

$\frac{-x=0}{-1\ -1}$ $x=4$ $x=-3$

$x=0$



(a) The function f is decreasing over which intervals? Choose all that apply.

$(-\infty,-9)$ $(-6,-2)$ $(-6,2)$
$(2,6)$ $(6,9)$ $(9,\infty)$

(b) The function f has local minima at which x-values? If there is more than one value, separate them with commas.

-9,-2,6

(c) What is the sign of the leading coefficient of f? disco left

Positive Negative Not enough information

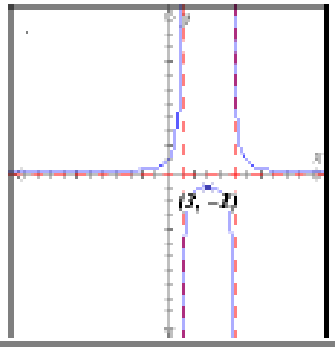
(d) Which of the following is a possibility for the degree of f? Choose all that apply.

4 5 6 7 8 9

seven faces (7 or more) disco means odd

8. The figure below shows the graph of a rational function f with vertical asymptotes $x=1$, $x=5$ and horizontal asymptote $y=0$ The graph does not have an x-intercept, and it passes through the point $(3,-1)$

The equation for $f(x)$ has one of the five forms shown below. Choose the appropriate form for $f(x)$ and then write the equation. You can assume that $f(x)$ is in simplest form.

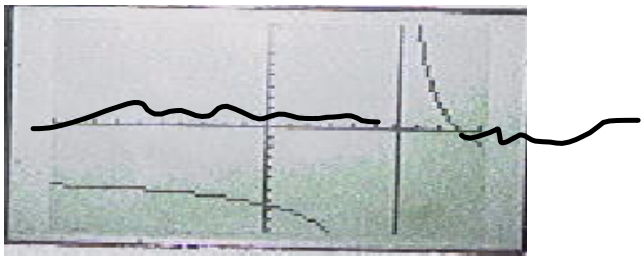


- $f(x)=\frac{a}{x-b}$
- $f(x)=\frac{a(x-b)}{x-c}$
- ✓ $f(x)=\frac{a}{(x-b)(x-c)}$ because NO zeros,
- $f(x)=\frac{a(x-b)}{(x-c)(x-d)}$ but 2 VA's
- $f(x)=\frac{a(x-b)(x-c)}{(x-d)(x-e)}$

$$y=\frac{a}{(x-1)(x-5)} \qquad -1=\frac{a}{(3-1)(3-5)} \qquad a=4$$

$$y=\frac{4}{(x-1)(x-5)}$$

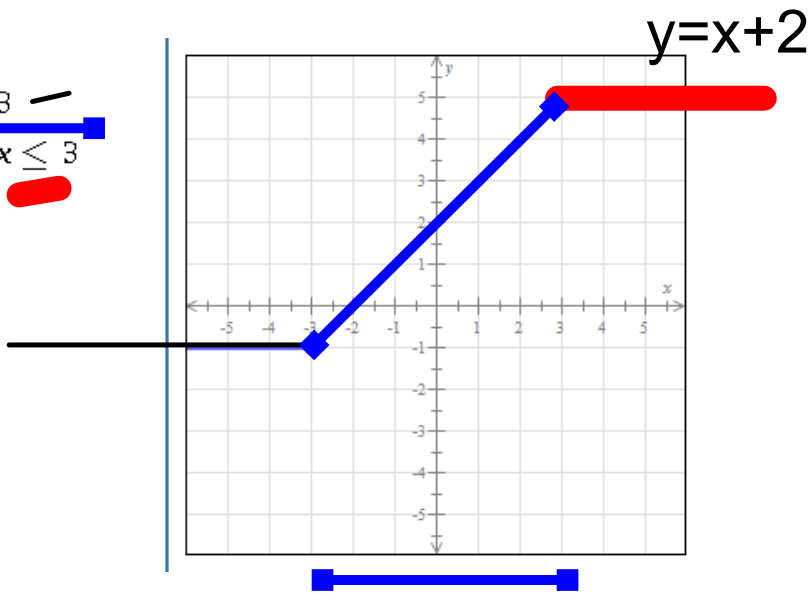
$$\frac{15}{x-6} - 5 \leq 0$$



(-inf,5)U[8,inf)

$(-\infty, 6) \cup [9, \infty)$

$$f(x) = \begin{cases} -1 & \text{if } x \leq -3 \\ x+2 & \text{if } -3 < x \leq 3 \\ 5 & \text{if } x > 3 \end{cases}$$



Graphing rational functions with holes

Graph the rational function $h(x)=\dfrac{-3x^2+15x}{x^2-7x+10}$.

We first factor, if possible, and note any restrictions on the value of x.

$$h(x)=\frac{-3x^2+15x}{x^2-7x+10}=\frac{-3x(x-5)}{(x-2)(x-5)} \qquad x\neq 2,\ x\neq 5$$

still true..

get a hole