

Precalculus = Functions

Jobs = Predicting

Answering Questions

When is a disease going to stop?

What's popular ages for internet

What's the best price?

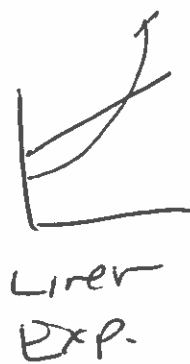
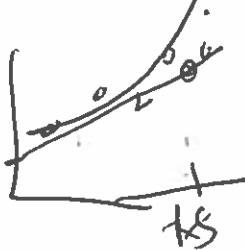
3 ways to Represent Function

Data

x	y
14	20
13	19

Graph

Plot



Equation.

1. Linear.
2. Quadratic
3. Cubic
4. Quartic
5. exponential
6. Log.
7. Rational.

Geography of Functions.

Domain (x-value inputs)

Range. (y-values.

X intercepts. (Zero)

Y intercepts (x = 0)

Horizontal Asymptotes

Slant Asymptotes

Vertical Asymptotes

Dicro Ends vs.

Happy/Sad Parabolas.

Touching vs Passing Thr.

Volcanos vs. heart beats.

Things done to Functions.

Transformations

$$f(x+b) \text{ or } af(x)$$

Up
down

$$\text{or } f(x)+C$$

Shrink
Stretch

$$af(x+b)+C$$

reflect

① move to $-b$

② stretch a

③ up by C

Composite

$$(f \circ g)(x) = f(g(x))$$

"Assembly Line"

$$x \xrightarrow{g} g(x) \xrightarrow{f} f(g(x))$$

Inverse. (undoes a function)

$$f(x) = 2x \quad g(x) = x+2$$

$$f^{-1}(x) = \frac{1}{2}x \quad g^{-1}(x) = x-2$$

$$h(x) = b^x$$

$$h^{-1}(x) = \log_b(x)$$

$$y = 3x + 6 \quad 0 = 3x + 6$$

$$y(0) = 6$$

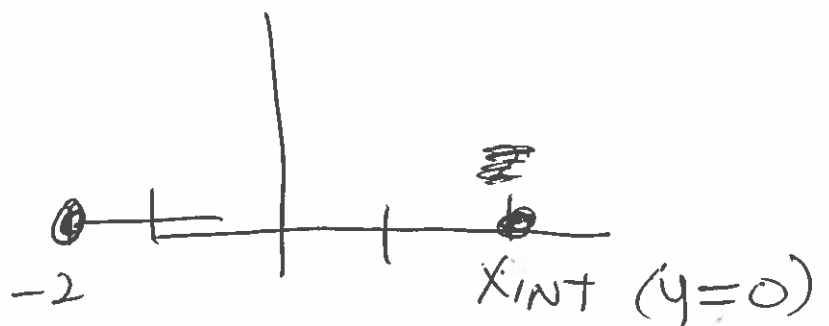
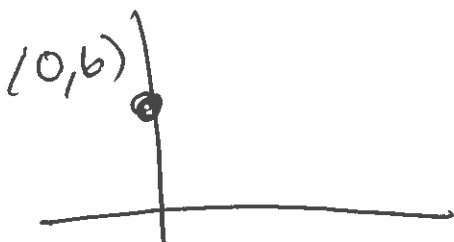
x	y
0	6
-2	0

Evaluate

$$y^{-1}(0) =$$

x	y
6	0
0	-2

Solve.



So $y = 3x + 6$

$$y^{-1} = \frac{x-6}{3}$$

$$y(0) = 6$$

$$y^{-1}(0) = -2$$

$$y(-2) = 0$$

$$y^{-1}(6) = 0$$

Use the inverse to find x-int.

Ex $y = 3 \log_2(x-7) + 5$

Parent: $\log_2(x)$

1. Right by 7

2. Stretch by 3

3. Up by 5

Find y intercept ($x=0$)

oops... $3 \log_2(-7) + 5$ No Log of
Negatives
No Solution.

Find Inverse? 1. solve for x in terms of y .
2. Switch x & y .

$$y = 3 \log_2 (x-7) + 5$$

Algebra

$$y - 5 = 3 \log_2 (x-7)$$

Algebra

$$\frac{y-5}{3} = \log_2 (x-7)$$

PI - Definition

$$2^{\frac{y-5}{3}} = x-7$$

Algebra

$$2^{\frac{y-5}{3}} + 7 = x$$

$$y^{-1} = 2^{\frac{x-5}{3}} + 7$$

where's y -intercept. ($x=0$) $2^{-5/3} + 7$

$$2 \wedge (-5/3) + f = 7.31\dots$$

y -intercept to y^{-1}

7.31 x -int. to y

Take away...

$$y = f(x)$$

$$x = f^{-1}(y)$$

Solve for $b = f(x)$

Evaluate $x = f^{-1}(b)$

the
"inverse" a/b

Equations with Logs + Exponents

Ex $5^{x+3} = 2^{2x-7}$ (P5)

$$\ln 5^{x+3} = \ln 2^{2x-7}$$

(P3)

$$(x+3) \ln 5 = (2x-7) \ln 2$$

(Algebra)

$$x \ln 5 + 3 \ln 5 = 2x \ln 2 - 7 \ln 2$$

(Algebra)

$$x (2 \ln 2 - \ln 5) = 3 \ln 5 + 7 \ln 2$$

(Algebra)

$$x = \frac{3 \ln 5 + 7 \ln 2}{2 \ln 2 - \ln 5}$$

calculator methods

1. Solver

2. Intersection

3. Zeros

4. Tables

5. WolframAlpha