$$y = \frac{2}{f^{-1}(x)} + 4$$

1) f^{-1}
2) $\frac{1}{y}$
3) $VE = 2$
4) $VT = +4$

$$y = \frac{2}{f^{-1}(x-2)+4}$$

1) f^{-1}
2) $HT = +2$
3) $VT = +4$
4) $\frac{1}{y}$
5) $VE = 2$

Transformations $(2x)^2 = 4x^2$

Horizontal Translations are the **Opposite** of what you see inside the brackets to the **x-value**. (attached to the variable)

Horizontal Expansions and Compressions are the **Reciprocal** of what you see inside the brackets to the **x-value.**

Do the **opposite/reciprocal** of what you see inside the brackets to the **x-value.**

Vertical Translations are the **Opposite** of what you see on the left hand side to the y-**value**. Attached to the variable.

"k" may be on the left hand side of the equation: $y - k = f(x)$. So add or subtract "k" to both sides.

Do exactly what you see outside of the brackets on the right-hand side to the **y-value.**

"a" may be on the left side of the equation: $ay = f(x)$. So multiply or divide by "a" to both sides.

DMAS. Inverse 1st. Function Operations 1st. Inside Out. Order Matters.

Factor the brackets so x has a coefficient of 1 (Can't factor out of/distribute into a function).

Put whatever is inside the brackets in for x. Substitute with Brackets.

How wide/tall is it/now? What happened? Any reflections? Pick a point, not an intercept, do exp/comp/ref, Moved?

Invariant Points/Inverse Check/The function doesn't change.

Radicals $\sqrt{4x} = 2\sqrt{x}$ $\sqrt{x^2} = |x|$ $\sqrt{x} = x^{\frac{1}{2}}$

Remember: Choose increments of x in your table of values that square root easily.

Invariant Points: $(x, 0), (x, 1)$

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

Polynomials | Calc: Store x |

Long - Goes Into, Multiply, Subtract, Bring Down, Repeat

Synthetic - Bring Down, Multiply, Add, Repeat

$f(a) = 0$, $(x - a)$ is a Factor $(Or\ not\ f(a) = R)$

Missing Terms "Insert 0"

$$\frac{dividend}{divisor} = quotient + \frac{remainder}{divisor}$$

Trigonometry

Calculator must be in radian mode

Rationalize

$\theta = \sin^{-1}(+)$ | Graph Zoom 7 (Trig) |

Trig Functions

$sin\theta = 0, \theta = 0, \pi, 2\pi$

$cos\theta = 0, \theta = \frac{\pi}{2}, \frac{3\pi}{2}$

+Sin starts in the middle and goes up

+Cos starts from the top and goes down

$x -$**Increments** $= \#, \frac{\pi}{lcd\ c,p}$ $end = c + p$ $p = \frac{2^*\pi}{b}$

"b" multiplies the # of original solutions between $0 \le \theta \le 2\pi$

Trig Identities

$\sin^2 x = sinx \times sinx = $ <mark>$(sin(x))^2$</mark> $\ne sin\ x^2$

$\cos(x + \pi) \ne cosx + cos\pi$

Exponentials

$2(3)^x \ne 6^x$

Growth/Decay

The exponent is the time or the number of time periods!

Logarithms

The thing you are Logging equals the Base to the other side.

The base of the log is the base of the exponent.

The exponent is the Answer.

$log(x + 3) \ne logx + log3$

$\quad (logx)^m \ne mlogx$

Logs and Exponentials are inverses of each other

Rational's

Holes before VA's

A graph can cross a horizontal asymptote

Function operations

$$f(x^3) \ne (f(x))^3 = f^3(x) = [f(x)]^3$$
$$; f(x)^3\ Never$$

Combinatorics

Logic/Repeats/Replacement