March 2 (Mon)

Quiz on Thurs

Youtube: "Tranformatim of Functions" by Teacher Tube Math

MCR3U
Ms. Kueh

Combinations of Transformations

Stretched vertically by a factor of a
- If $a > 1$, the graph is expanded
- If $0 < a < 1$ the graph is compressed
- If $a < 0$, the graph is reflected in the x-axis

= reflection

Translated vertically c units
- If $c > 0$, the graph shifts up
- If $c < 0$, the graph shifts down

$$y = af\left(k\left(x-d\right)\right)+c$$

Stretched horizontally by a factor of $1/k$
- If $k > 1$, the graph is compressed
- If $0 < k < 1$ the graph is expanded
- If $k < 0$, the graph is graph is reflected in the y-axis

= reflection

Translated horizontally d units
- If the sign is negative, the graph shifts to the right
- If the sign is positive, the graph shifts to the left

* If the equation is not in this form, you have to rearrange or simplify (or factor) so the equation looks like $y = af(k(x-d))+c$

The a affects the graph $y = f(x)$ by stretching or compressing vertically by a factor of a.

If the a is negative, there is a reflection about the x axis.

The d affects the graph $y = f(x)$ by translating horizontally d units.

The c affects the graph $y = f(x)$ by translating vertically c units.

The k affects the graph $y = f(x)$ by stretching or compressing horizontally by a factor of $\left(\frac{1}{k}\right)$. = only x coordinates will be multiplied by $\frac{1}{k}$ for given points.

If the k is negative, there is a reflection about the y axis.

Does the order of transformations matter? Shifting always occur last. An easy way is to transform left to right on the equation.

F: Inverse Function
M: Review for Unit Test

Wed: // // // //
TH: Unit Test

Graphing Point by Point (alternative method of graphing)

1) Start by graphing the base function ($y=x^2, y=\sqrt{x}, y=x^3, y=|x|, y=\frac{1}{x}$).

2) Graph a by taking the significant point (x, y) and multiply only the y-values by a so that the point (x, y) becomes (x, ay).

3) Graph k by taking the significant point (x, y) and multiply only the x-values by $\frac{1}{k}$ so that the point (x, y) becomes $\left(\frac{x}{k}, y\right)$.

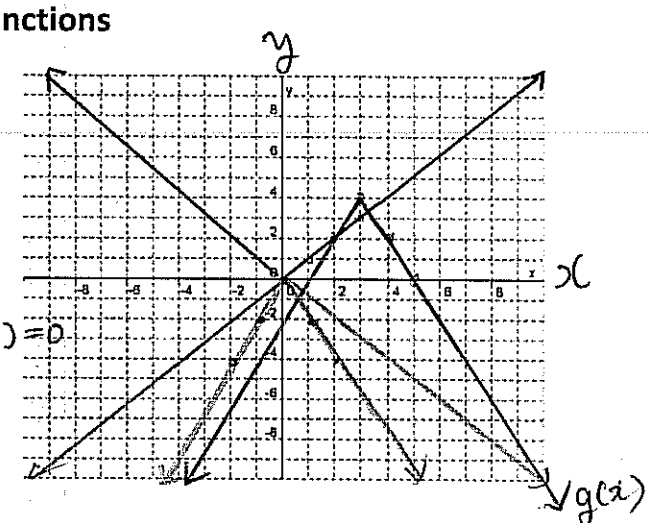
4) Graph d by taking the significant point (x, y) and adding d to the x-value so that the point (x, y) becomes $(x+d, y)$.

5) Graph c by taking the significant point (x, y) and adding c to the y-value so that the point (x, y) becomes $(x,\ y+c)$.

Example 1 – Sketching Graphs of Transformed Functions

1. Given the graph of $f(x)=|x|$, describe how you would graph $g(x)=-2f(x-3)+4$ using transformations.

① Draw parent function $f(x)=|x|$
② reflect it in x axis.
③ stretch vertically by 2
④ shift 3 units to the right = what makes ( ) = 0
⑤ shift up 4 units.



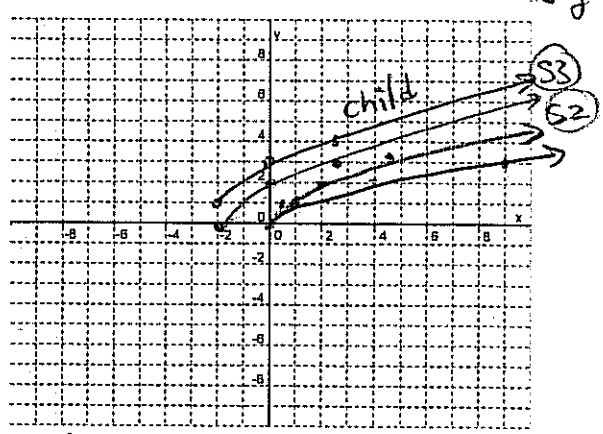
2. a) Using transformations, sketch the graph of $y=\sqrt{2x+4}+1$.

Parent F: $f(x)=\sqrt{x}$

Hint: Rewrite $2x+4$ in factored form to determine the horizontal translation.

$y=\sqrt{2(x+2)}+1$

① Draw parent function
② Horizontal compression by $\frac{1}{2}$
③ shift left 2 units
④ shift up 1 unit.



x, y	x, y
1, 1	$\frac{1}{2}$, 1
4, 2	2, 2
9 3	$\frac{9}{2}$, 3