

Key

8. MORE FUNCTION TRANSFORMATIONS & Tricky Stuff

Date: ____

General Function Model: $y = a f [b(x-c)] + d \rightarrow$

Therefore, $h = \underline{c}$ and $k = \underline{d}$.

$(\frac{x}{b} + c, ay + d)$

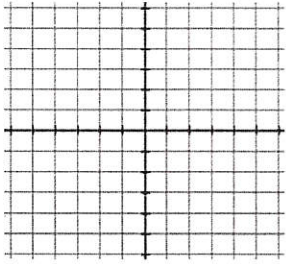
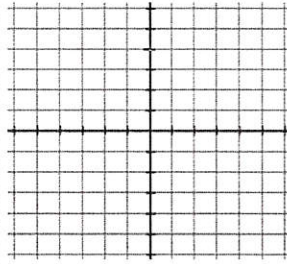
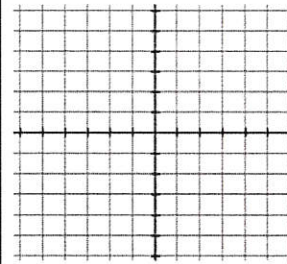
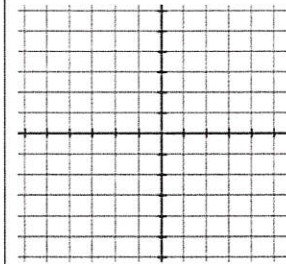
GENERAL EQUATION OF FUNCTIONS

$a =$

$b =$

$h =$

$k =$

Quadratic Function $f(x) = x^2$	Cubic Function $f(x) = x^3$	Absolute Value Function $f(x) = x $	Square Root Function $f(x) = \sqrt{x}$
			
$y = a(x-h)^2 + k$	$y = a(x-h)^3 + k$	$y = a x-h + k$	$y = a\sqrt{x-h} + k$

What do you notice about "b" in the general function model? Therefore, given

$f(x) = |3x - 6| + 8$

it is factored out!

What must we do first? What do you know about absolute value and slope?

$f(x) = |3(x-2)| + 8 \quad \therefore b = 3 \rightarrow (\frac{x}{3} + 2, y + 8)$

Can we go further?

$= 3|x-2| + 8 \quad \therefore a = 3 \quad (x+2, 3y+8)$

Given $f(x) = -\frac{1}{2}\sqrt{5-x}$

what must we do first? Then what?

Do these produce same graph?

$f(x) = -\frac{1}{2}\sqrt{-x+5}$

$= -\frac{1}{2}\sqrt{-1(x+5)}$

$= -\frac{1}{2}\sqrt{-1(x-5)}$

$\rightarrow (\frac{x}{-1} + 5, -\frac{1}{2}y)$

Remember this when you get to #33 on the back!

MORE PRACTICE WITH TRANSFORMATIONS!

* Absolute Value
= Slope

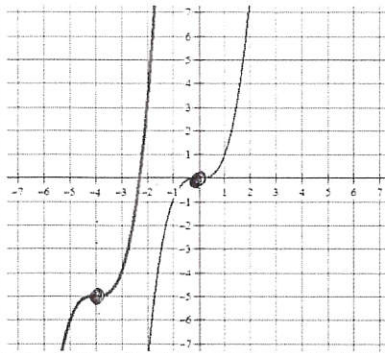
$y = |x|$ = slope of 1 $\frac{\Delta y}{\Delta x} = \frac{1}{1}$
 $y = 2|x|$ = slope of 2 $\frac{2}{1}$
 $y = 3|x|$ = slope of 3 $\frac{3}{1}$

$$y = x^3$$

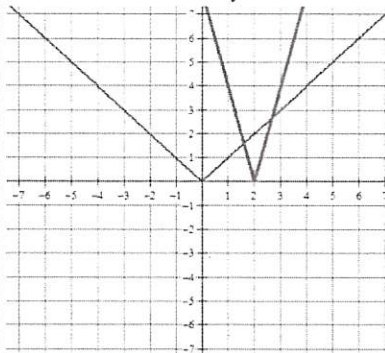
left 4, down 5 } $\left. \begin{array}{l} \text{rt } 2 \\ \text{rt } 1 \end{array} \right\} \text{ up } \frac{3}{1} \rightarrow \text{V.S. b.a.f.o } 3$

The graph of a parent function and a transformation of the parent function are given. Write the equation of the transformed function.

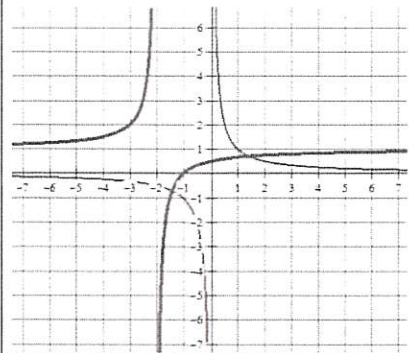
25. $y = (x + 4)^2 - 5$



26. $y = 3|x - 2|$



27.



Match the function to its graph WITHOUT using a graphing calculator!

31. $y = 2\sqrt{x-3} + 2$

F $c=3$

32. $y = \sqrt{x+3} + 2$

D $d=2$

33. $y = \sqrt{3-x} + 2$

E

34. $y = \sqrt{x-3} + 2$

$-x+3$
 $-(x-3)$

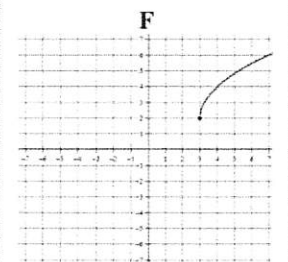
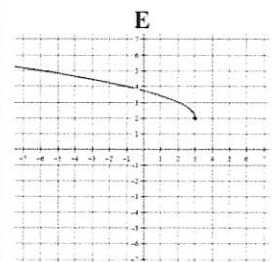
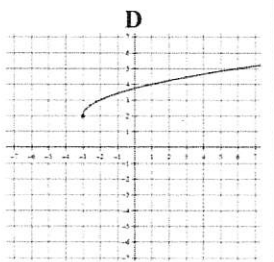
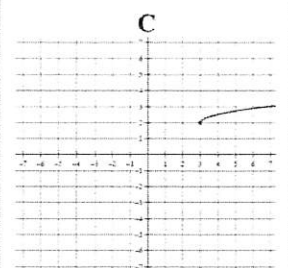
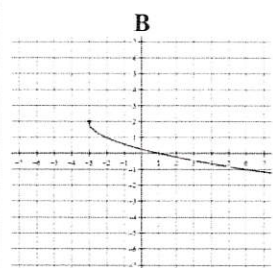
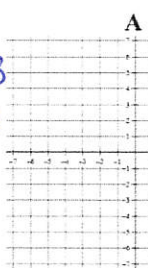
A

35. $y = -\sqrt{x+3} + 2$

B

36. $y = 0.5\sqrt{x-3} + 2$

C



Name the parent function. Then describe the transformation (translation, scale, and reflection) of the function if it exists.

Translation
Vertical Shift up/down ?
Horizontal Shift right/left ?

Scale
Vertical Stretch/Shrink of ?
Horizontal Stretch/Shrink of ?

Reflection
About the x-axis
About the y-axis

1. $y = 2(x + 1)^3$
NAME: Cubic
Translation: Left one,
Scale: Vertical
Reflection: Stretch

2. $y = -(x - 11)^2 - 5$
NAME: quadratic
Translation: 11 left,
Scale: reflect over x
Reflection: down 5.

3. $f(x) = |3x - 6| + 8$ $3|x-2|+8$
NAME: abs. value
Translation: 2 right
Scale: V.S. by afo 3
Reflection: up 8

B.A.F.O. 2 $(x+11, -1y-5)$ $(x+2, 3y+8)$
 $(x-1, 2y)$