Sheet #131: Transformations and Slopes

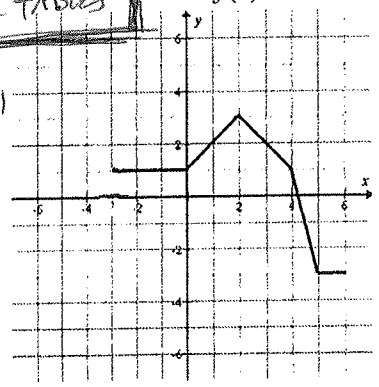
Name: KEY

* Updated 10/7/08 v.2

Given $f(x)$, sketch the following functions.

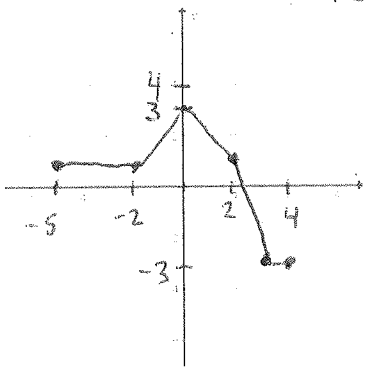
HINT: USE TABLES

$f(x)$

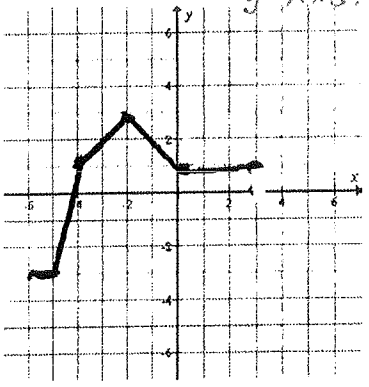


x	f(x)
-3	1
-2	1
-1	1
0	1
1	2
2	3
3	2
4	1
5	-3
6	-3

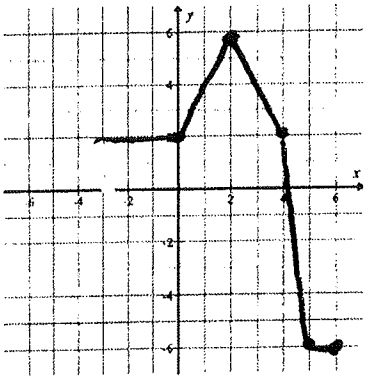
1. $g(x) = f(x+2)$ *SHIFT LEFT BY 2



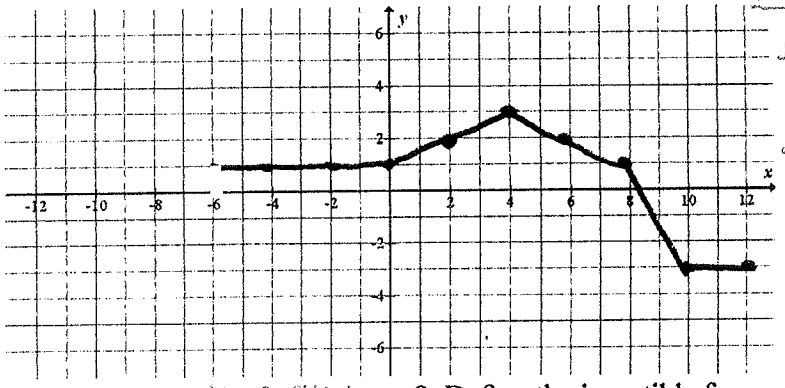
2. $h(x) = f(-x)$ REFLECT ABOUT y-AXIS.



3. $i(x) = 2f(x)$ VERTICAL STRETCH BY FACTOR OF 2



4. $j(x) = f(x/2)$ HORIZONTAL STRETCH BY FACTOR OF 2. FILL OUT VALUES:

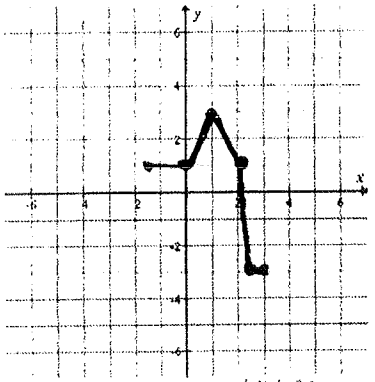


$j(2) = f(2/2) = f(1) = 2$

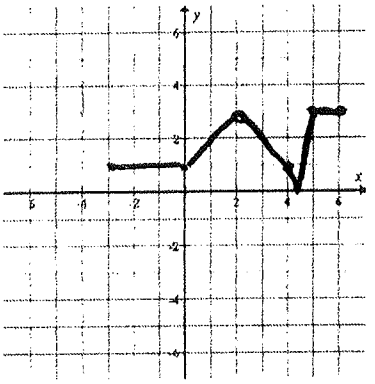
$j(4) = f(4/2) = f(2) = 3$

etc.

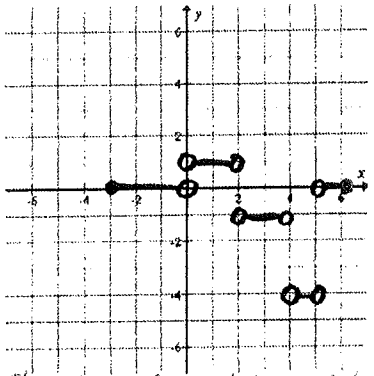
5. $k(x) = f(2x)$ HORIZ. SHRINK BY FACT. OF 2.



6. $l(x) = |f(x)|$ NEGATIVES BECOME POSITIVE.

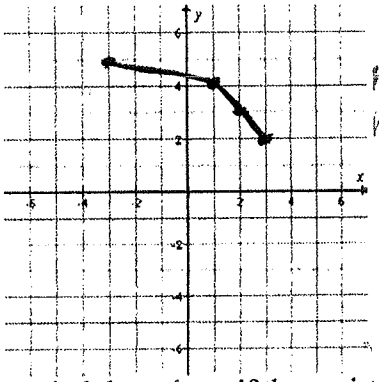


7. $m(x)$ = the value of the slope of $f(x)$ at each x



Slope is undefined at open circles.

8. Define the invertible function $n(x)$ to be $f(x)$ restricted to the domain [2, 5]. Sketch $n^{-1}(x)$, the inverse of $n(x)$. SWAP x and y:



$h(2) = f(2) = 3$

$h^{-1}(3) = 2$

etc.

9. Find the values, if they exist.

a) $4f(3) - 5 = 4(2) - 5 = \boxed{3}$

b) $f(g(3)) = f(-3) = \boxed{1}$ *

c) $h(4) =$ NOT IN DOMAIN. UNDEFINED

d) $k(g(f(1))) = k(g(2)) = k(1) = \boxed{3}$ *

e) $n^{-1}(-1) = \boxed{4.5}$

10. Find the values of the slopes.

a) Slope of $f(x)$ at $x = 3$. $\boxed{-1}$

b) Slope of $f(2x)$ at $x = 1.5$. $\boxed{-2}$

HORIZ. SHRINK → SLOPE MULTIPLIES BY 2. BY FACTOR OF 2

c) Slope of $f(x/2)$ at $x = 6$. $\boxed{-1/2}$

d) Slope of $2f(x)$ at $x = 3$. $\boxed{-2}$

e) Slope of $0.5f(x)$ at $x = 3$. $\boxed{-1/2}$

f) Slope of $f(100x)$ at $x = 0.03$. $\boxed{-100}$

g) Slope of $n(x) = f(x)$ at $x = 4.5$. $\boxed{-4}$

h) Slope of $n^{-1}(x)$ at $x = -1$. $\boxed{-1/4}$

RECIPROCAL OF ANSWER IN QUESTION 10g.