Solutions

Funky Functions Booster

#1 Given:

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

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

$$h(x) = (x+4)^2 - 6$$

Determine:

(a) $f(-8)$

$f(-8) = -\frac{1}{2}(-8) + 5$

$= 4 + 5$ ✓

$= 9$

(b) $g(h(-1))$

$h(-1) = (-1+4)^2 - 6$

$= 9 - 6$

$= 3$ ✓

$g(3) = \frac{1-3}{2}$

$= -1$ ✓

(c) $h^{-1}(3)$

$y = (x+4)^2 - 6$

$\boxed{INV}$ $x = (y+4)^2 - 6$

$x + 6 = (y+4)^2$ ✓✓

$\pm\sqrt{x+6} = y + 4$

$y = -4 \pm \sqrt{x+6}$

$h^{-1}(x) = -4 \pm \sqrt{x+6}$

$h^{-1}(3) = -4 \pm \sqrt{3+6}$

$= -4 \pm \sqrt{9}$ ✓✓

$= -4 + 3$ or $= -4 - 3$

$= -1$ $= -7$

[KU-7]

#2 Given $y = -\sqrt{2x - 10} + 3$

(a) state the basic function
(b) describe in words all transformations
(c) determine the mapping notation needed to transform the function
(d) show the basic table of values and the image table of values for this function
(e) state the domain and the range of the image function

$y = -\sqrt{2(x-5)} + 3$

[KU-8]

(a) $y = \sqrt{x}$

(c) $(x, y) \longrightarrow (\frac{1}{2}x + 5, -y + 3)$

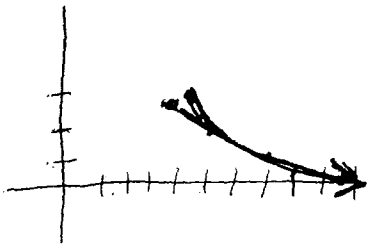
(b) reflection x-axis
HS $\times \frac{1}{2}$
right 5
up 3

(d)

x	y
0	0
1	1
4	2
9	3

$\longrightarrow$

x	y
5	3
11/2	2
7	1
19/2	0



(e) $D = \{x \mid x \geq 5, x \in \mathbb{R}\}$

$R = \{y \mid y \leq 3, y \in \mathbb{R}\}$

#3 Prove that the inverse of the function $y = -\left|\frac{1}{2}x - 2\right| + 5$ is not a function.

$\hookrightarrow y = -\left|\frac{1}{2}(x-4)\right| + 5$ ✓ ✓

$(x, y) \rightarrow (2x+4, -y+5)$

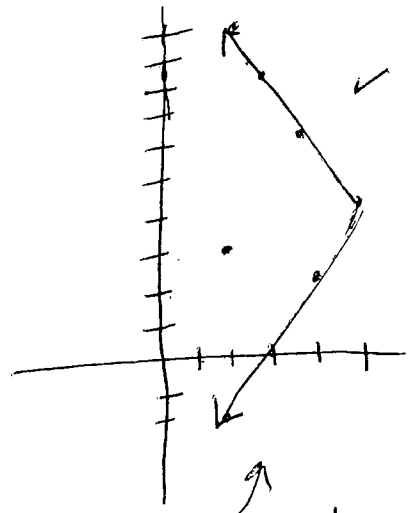
$y = |x|$

x	y
-3	3
-2	2
-1	1
0	0
1	1
2	2
3	3

x	y
-2	2
0	3
2	4
4	5
6	4
8	3
✓ 10	2

INVERSE

x	y
2	-2
3	0
4	2
5	4
✓ 4	6
3	8
2	10



✓

[APP-6]

∴ the inverse of the original function is <u>not</u> a function ✓

Not a Function
FAILS THE VERTICAL LINE TEST

#4 The graph $y = x^3$ is vertically stretched by a factor of 5, reflected in the y-axis, moved to the right 7 and moved down 2. Write the equation of the new function.

$$y = 5(-(x-7))^3 - 2$$

<u>or</u>

$$y = 5(-x+7)^3 - 2$$

✓ ✓ ✓

[APP-3]