h(x) FUNction Summary TEMPLATE

$$\begin{bmatrix} \text{MATH by Wilson} \\ \text{Your Personal Mathematics Trainer} \\ \text{MathByWilson.com} \end{bmatrix}$$

FUNCTION: $\mathbf{h(x)} = 3 - \sqrt{3x-6}$

$\mathbf{f(x)} = \sqrt{\mathbf{x}}$

$\mathbf{A} = -1$: Reflection in x-axis

$\mathbf{B} = 3$: Horizontal Contraction

$\mathbf{C} = -6$: Horizontal Translation ; 2 units to the right

$\mathbf{D} = 3$: Vertical Translation ; 3 units upward

Note: Since $\mathbf{h(x)}$ is "nice", we can find the graph of $\mathbf{h(x)}$ *before* finding **all** of the FUNction Summary Properties. However, we will still put its graph in Step #10 below. Appropriate calculations are shown at the bottom of the template.

1) **DOMAIN:**

   $\mathbf{Dom\ h} = [2, +\infty)_{\mathbf{x}}$

2) **INTERCEPT POINT(S):**

   y-intercept point: None

   $\mathbf{x}$ – intercept points: $(5, 0)$

3) **CONTINUITY AND RELATED TOPICS:**

   $\mathbf{CONT\ h} = [2, +\infty)_{\mathbf{x}}$

   $\mathbf{DISCONT\ h} = $ Where it is undefined

   $\mathbf{Hole\ h} : \text{N/A}$

   $\mathbf{Fin\_Jp\ h} : \text{N/A}$

   $\mathbf{V\_Asy\ h} : \text{N/A}$

Advanced : N/A

POS h $= [2,5)_x$

NEG h $= (5,+\infty)_x$

4) **BEHAVIOUR AT (TOWARD) INFINITY:**

$\underset{x\to-\infty}{\textbf{LIM}} \textbf{h}(\textbf{x}) = \not\exists$; does not exist ; no graph

$\underset{x\to+\infty}{\textbf{LIM}} \textbf{h}(\textbf{x}) = -\infty$; as the x-values increase without bound,

the cooresponding y-values decrease without bound

H _ Asy h : N/A

5) **SYMMETRY (y -axis** *or* $(0,0)$ **):**

Even h : No

Odd h : No

6) **INCREASING AND DECREASING:**

INC h $= \varnothing$; Empty Set
DEC h $= [2,+\infty)_x$

7) **RELATIVE MAXIMUM AND/OR MINIMUM POINT(S):**

R _ MAX _ Pt h : $(2,3)$

R _ MIN _ Pt h : N/A

… OMIT FOR NOW …
except range if known

8) **CONCAVITY:**

CU h $= (-\infty,+\infty)_x$

CD h = $\varnothing$; Empty Set

9) INFLECTION POINT(S):

INF _ Pt h : N/A

10) GRAPH:

GRAPH h :

$h(x) = 3 - Sqrt(3x - 6)$

(2,3)

(5,0)
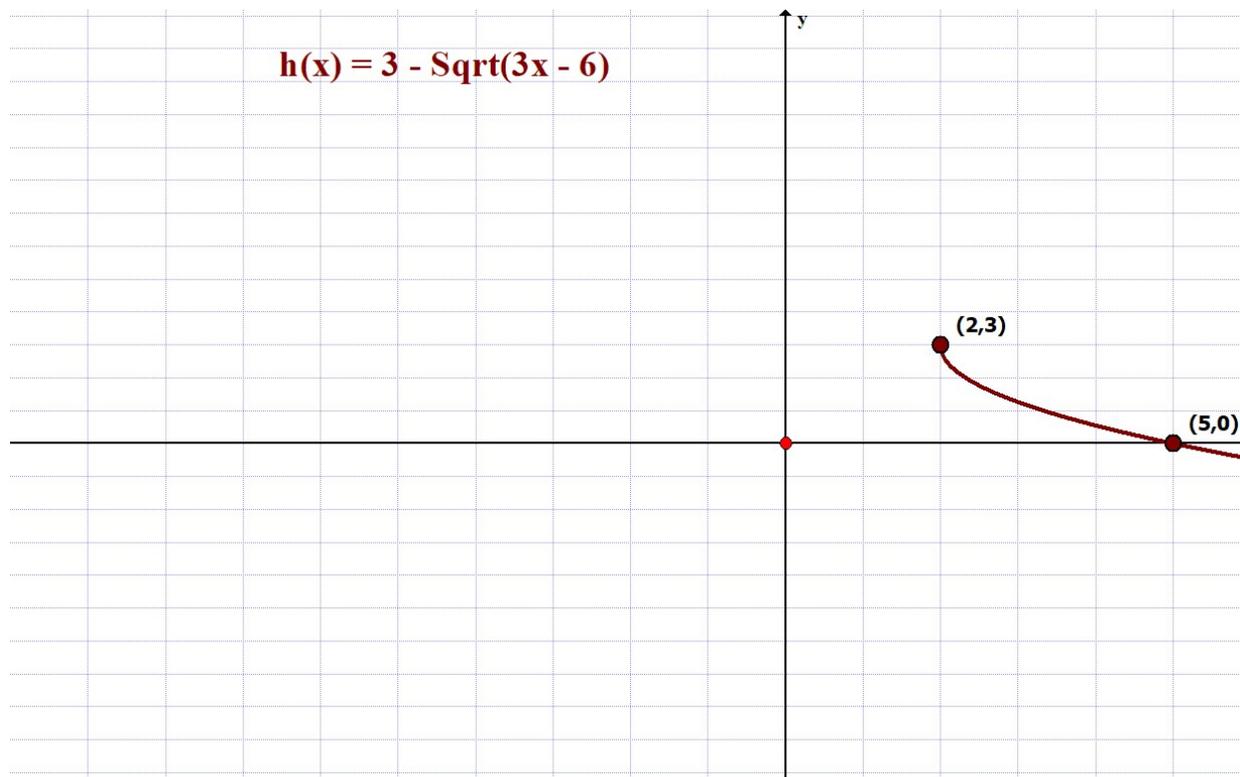
11) ABSOLUTE MAXIMUM AND/OR MINIMUM POINT(S):

A _ MAX _ Pt h : $(2,3)$

A _ MIN _ Pt h : N/A

12) RANGE:

RANGE h $= \left(-\infty, 3\right]_y$

Calculations:

1. Domain: $3\mathbf{x} - 6 \geq 0 \Rightarrow \mathbf{x} \geq 2 \Rightarrow \mathbf{Dom\ f} = \left[2, +\infty\right)_x$

2. Intercepts:
    a. y-intercept: $0 \notin \mathbf{Dom\ f} \Rightarrow$ None
    b. x-intercepts:
    $$\mathbf{h(x)} \overset{\mathbf{SET}}{=} 0 \Rightarrow 3 - \sqrt{3\mathbf{x} - 6} \Rightarrow \sqrt{3\mathbf{x} - 6} = 3$$
    $$\Rightarrow 3\mathbf{x} - 6 = 9 \Rightarrow \mathbf{x} = 5 \Rightarrow \left(5, 0\right)$$

3. Continuity:

No Graph ⏞ _____ 2 _____ ⏞ + _____ 5 _____ ⏞ − _____