

## **h(x) FUNCTION Summary TEMPLATE**

$$\left[ \begin{array}{c} \text{MATH by Wilson} \\ \text{Your Personal Mathematics Trainer} \\ \text{MathByWilson.com} \end{array} \right]$$

**FUNCTION:**  $h(x) = -3|2x - 5| + 4$

$$f(x) = |x|$$

**A** = -3 : Vertical Stretch ; Reflection in x-axis

**B** = 2 : Horizontal Contraction

**C** = -5 : Horizontal Translation ; 5/2 units to the right

**D** = 4 : Vertical Translation ; 4 units upward

Note: Since  $h(x)$  is “nice”, we can find the graph of  $h(x)$  *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:**

$$\text{Dom } h = \mathbb{R}_x$$

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

y-intercept point: (0, -11)

x - intercept points:  $\left(\frac{11}{6}, 0\right); \left(\frac{19}{6}, 0\right)$

### **3) CONTINUITY AND RELATED TOPICS:**

$$\text{CONT } h = \mathbb{R}_x$$

**DISCONT**  $h = \emptyset$  ; Empty Set

**Hole**  $h$  : N/A

**Fin \_ Jp**  $h$  : N/A

**V \_ Asy**  $h$  : N/A

**Advanced :** N/A

$$\text{POS } h = \left( \frac{11}{6}, \frac{19}{6} \right)_x$$

$$\text{NEG } h = \left( -\infty, \frac{11}{6} \right)_x \cup \left( \frac{19}{6}, +\infty \right)_x$$

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

$\lim_{x \rightarrow -\infty} h(x) = -\infty$  ; as the x-values decrease without bound,  
the corresponding y-values decrease without bound

$\lim_{x \rightarrow +\infty} h(x) = -\infty$  ; as the x-values increase without bound,  
the corresponding y-values decrease without bound

**H\_Asy h :** N/A

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

**Even h :** No

**Odd h :** No

**Other:**  $x = \frac{5}{2}$

**6) INCREASING AND DECREASING:**

$$\text{INC } h = \left( -\infty, \frac{5}{2} \right]_x$$

$$\text{DEC } h = \left[ \frac{5}{2}, +\infty \right)$$

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

$$\text{R\_MAX\_Pt } h : \left( \frac{5}{2}, 4 \right)$$

R\_MIN\_Pt h: N/A

**... OMIT FOR NOW ...**  
except range if known

8) CONCAVITY:

CU h = N/A

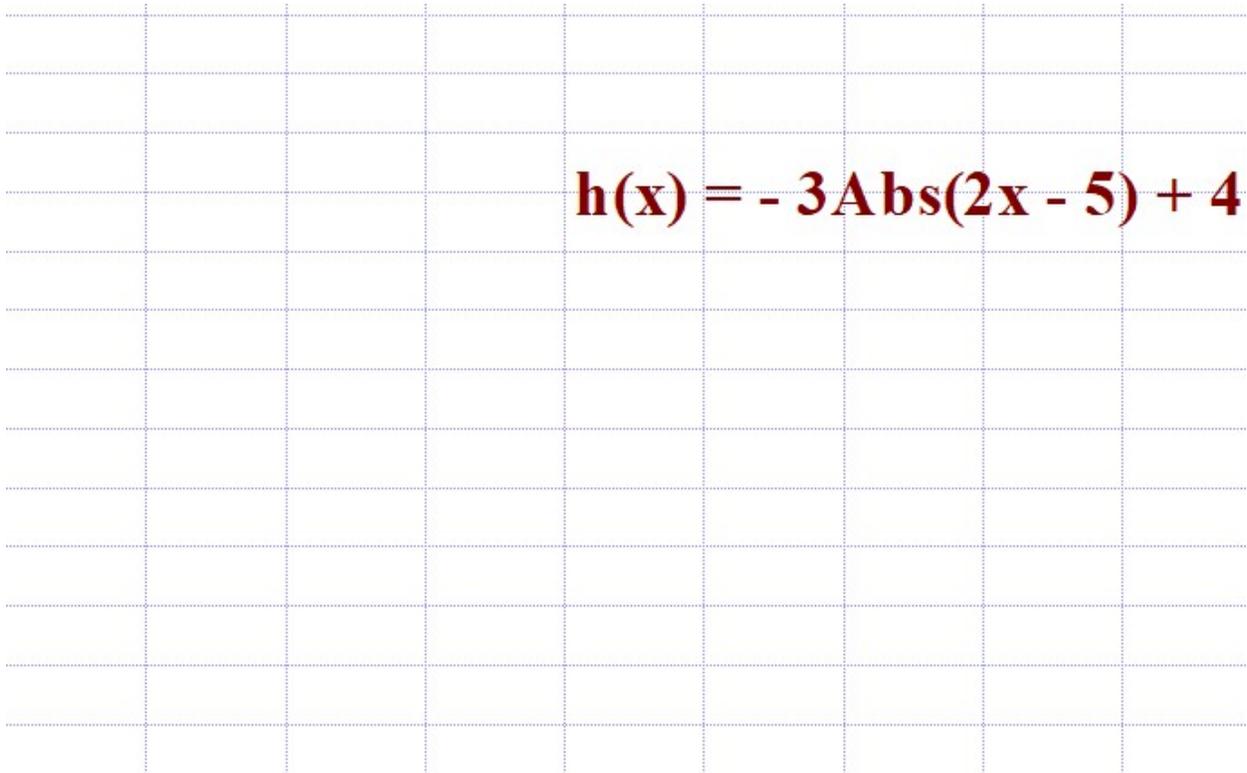
CD h =  $(-\infty, +\infty)_x$

9) INFLECTION POINT(S):

INF\_Pt h: N/A

10) GRAPH:

GRAPH h:



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

$$\mathbf{A\_MAX\_Pt\ h:} \left(\frac{5}{2}, 4\right)$$

$$\mathbf{A\_MIN\_Pt\ h:} \text{ N/A}$$

12) RANGE:

$$\mathbf{RANGE\ h} = (-\infty, 4]_y$$

**Calculations:**

1. Intercepts:

a. y-intercept:  $\mathbf{h(0) = -3|0 - 5| + 4 = -11 \Rightarrow (0, -11)}$

b. x-intercepts:

$$\mathbf{h(x) = 0 \Rightarrow -3|2x - 5| + 4 = 0 \Rightarrow |2x - 5| = \frac{4}{3} \Rightarrow}$$

$$2x - 5 = -\frac{4}{3} \quad \Bigg| \quad 2x - 5 = \frac{4}{3}$$

$$2x = \frac{11}{3} \quad \Bigg| \quad 2x = \frac{19}{3}$$

$$x = \frac{11}{6} \quad \Bigg| \quad x = \frac{19}{6}$$

$$\left(\frac{11}{6}, 0\right) \quad \Bigg| \quad \left(\frac{19}{6}, 0\right)$$

2. Continuity:

$$\overbrace{\hspace{1.5cm}}^- \quad 11/6 + \overbrace{\hspace{1.5cm}}^+ \quad 19/6 \quad \overbrace{\hspace{1.5cm}}^-$$