

$$3. \quad y = 3x^2 - 12x + 1$$

FINDING WHERE A GRAPH  
IS INCREASING/DECREASING

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① FIND DERIVATIVE

$$y' = 6x - 12$$

② SET THIS EQUAL TO ZERO  
AND SOLVE (CRITICAL NUMBERS)

$$6x - 12 = 0$$

$$6x = 12$$

$$\frac{6x}{6} = \frac{12}{6}$$

$$x = 2$$

③ USING CRITICAL NUMBERS, BUILD A TABLE OF INTERVALS, PICK  
TEST CASES, PLUG THEM INTO DERIVATIVE AND SIMPLIFY

    / (INC.)                  \ (DEC.)  
   POS.                      NEG.

	$-\infty$	$2$	$\infty$	
TEST CASES		$x = 0$	$x = 3$	
PLUG INTO DERIV.		$6x - 12$ $6(0) - 12$ $-12$	$6x - 12$ $6(3) - 12$ $18 - 12$ $6$	
		DEC	INC	

DEC  $(-\infty, 2)$

INC  $(2, \infty)$