5.8 GRAPHING & SOLVING QUADRATIC INEQUALITIES

Example 1 Solid shade above vertex $y = (x-h)^2 + k$ vertex form

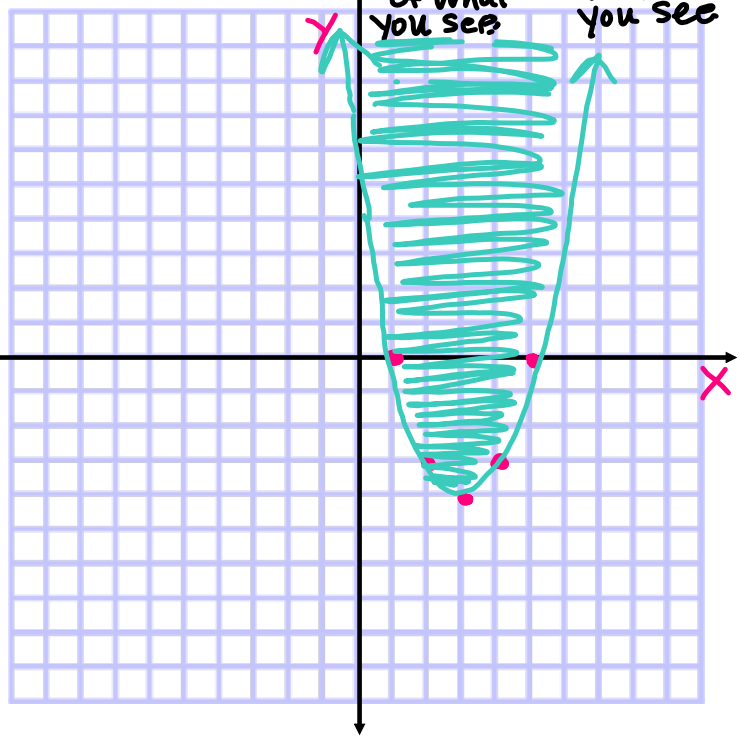
Graph the solution to $y \geq (x - 3)^2 - 4$.

vertex (3,−4) h=3 k=−4 (h,k) vertex

opposite of what you see

exactly what you see

x		y
1	$(1-3)^2 - 4$	0
2	$(2-3)^2 - 4$	−3
3	~~~	−4
4	$(4-3)^2 - 4$	−3
5	$(5-3)^2 - 4$	0



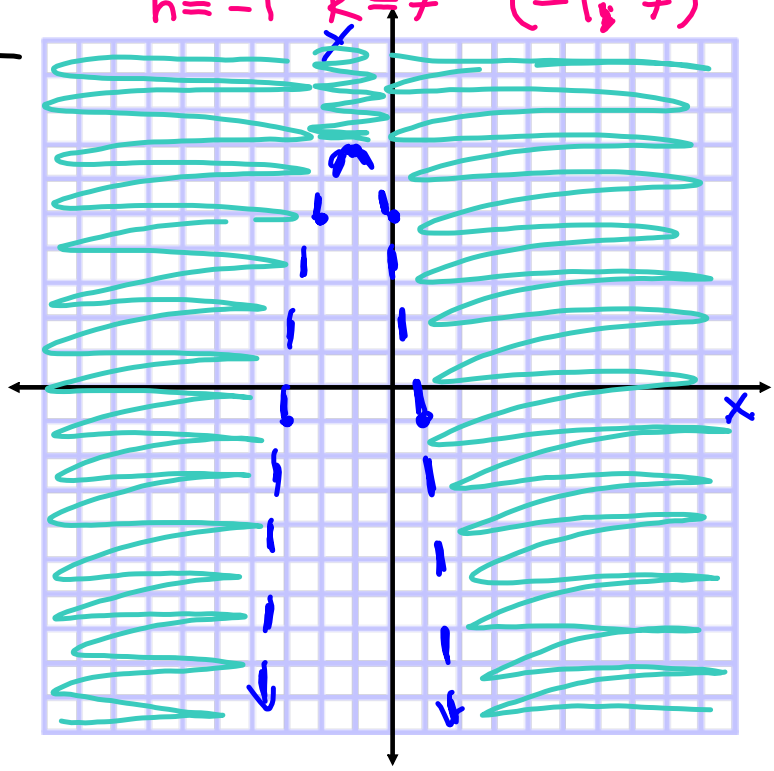
Example 2

Graph the solution to $y > -2(x + 1)^2 + 7$.

dotted parabola
shade above vertex

$h = -1$ $k = 7$ $(-1, 7)$

x		y
-3	$-2(-3+1)^2+7$	-1
-2	$-2(-2+1)^2+7$	5
-1		7
0	$-2(0+1)^2+7$	5
1	$-2(1+1)^2+7$	-1



Example 3

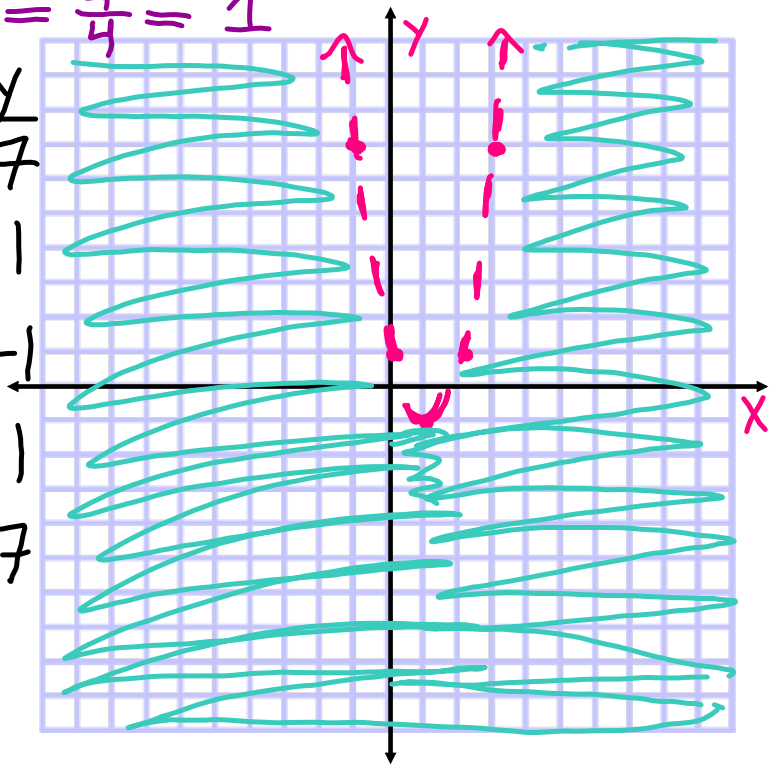
Graph the solution to $y < 2x^2 - 4x + 1$.

dotted parabola
shade below vertex

$a = 2$ $b = -4$

$x = \frac{-b}{2a} = \frac{4}{2(2)} = \frac{4}{4} = 1$

x		y
-1	$2(-1)^2-4(-1)+1$	7
0	$2(0)^2-4(0)+1$	1
1	$2(1)^2-4(1)+1$	-1
2	$2(2)^2-4(2)+1$	1
3	$2(3)^2-4(3)+1$	7



Example 4

Graph the solution to $y \leq -x^2 + 6x$.

$a=-1 \quad b=6$

Solid parabola
Shade below vertex

$x = \frac{-b}{2a} = \frac{-6}{2(-1)} = \frac{-6}{-2} = 3$

x		y
1	$-(1)^2+6(1)$	5
2	$-(2)^2+6(2)$	8
3	$-(3)^2+6(3)$	9
4	$-(4)^2+6(4)$	8
5	$-(5)^2+6(5)$	5