SOL HW 9.3

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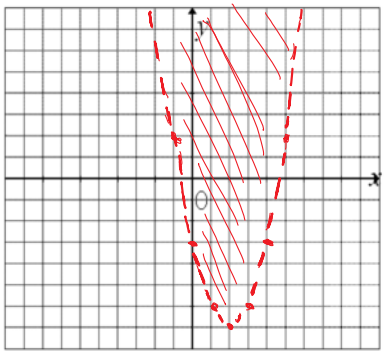
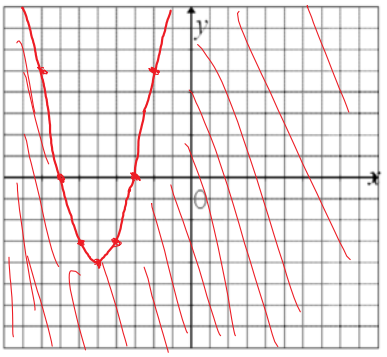
Pre Calculus 11: HW Section 9.3 Graphing Quadratic Inequalities on XY Plane

1. Graph each of the following inequalities and shade in the correct area:

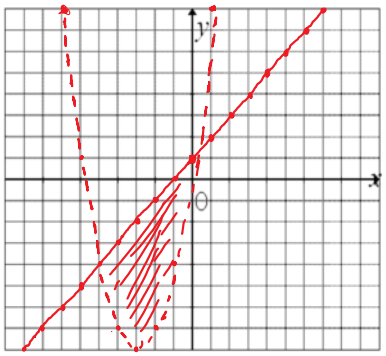
i) $y > (x-2)^2 - 7$



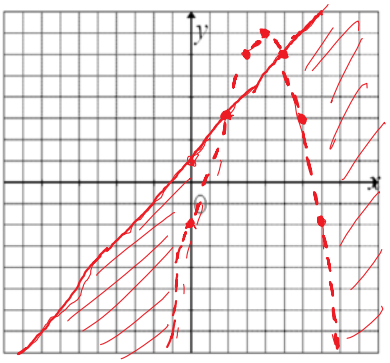
ii) $y \leq (x+5)^2 - 4$



iii) $y > (x+3)^2 - 8$ and $y \leq x+1$



iv) $y > -(x-4)^2 + 7$ and $y \leq x+1$



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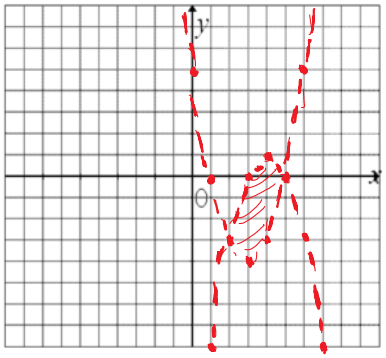
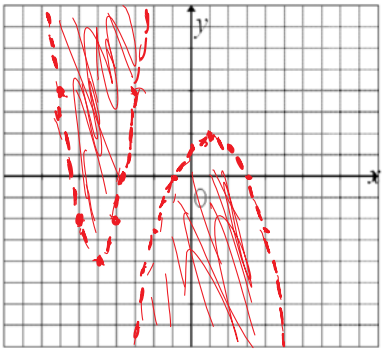
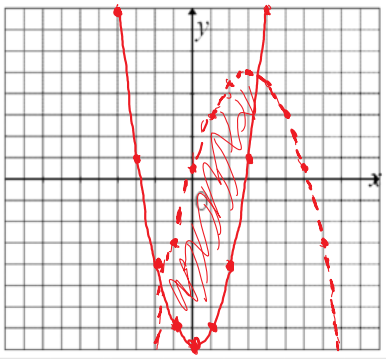
v)) $y > (x-3)^2 - 4$ and $y < -(x-4)^2 + 1$



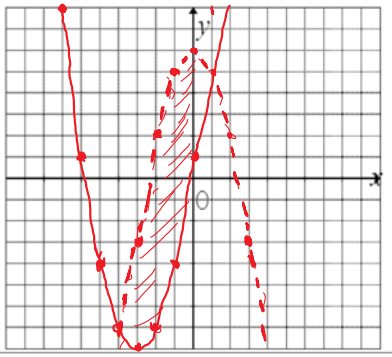
vi) $y > 2(x+5)^2 - 4$ and $y < -0.5(x-1)^2 + 2$



vii) $y < -0.5(x-3)\text{^}2+5$ and $y \geq x\text{^}2-8$



viii) $y \leq (x+3)^2 - 8$ and $y < -x^2 + 6$



2. Given the quadratic inequality: $y < -2(x-3)^2 + 4.5$, how many of the following points satisfy the inequality? $A(3,5)$ $B(3,-1)$ $C(1,-10)$ $D(-4,-9)$ $E(6,-13.5)$

$-1 < -2(3-3)^2 + 4.5$

$-1 < 0$ ✓

$-10 < -2(1-3)^2 + 4.5$

$-10 < -3.5$ ✓

3. When a baseball is hit by a batter, the height of the ball h(t), at time "t", $t \geq 0$, is determined by the equation $h(t) = -16t^2 + 64t + 4$. For which interval of time is the height of the ball greater than or equal to 52ft?

$52 \leq -16t^2 + 64t + 4$

$0 \leq -16t^2 + 64t - 48$

$\frac{-64 \pm \sqrt{64^2 - 4(-16)(-48)}}{-32} = t$

$t = 1 \text{ or } 3$

$1 \leq x \leq 3$

4. The profit of a coat manufacturer makes each day is modelled by the equation: $P(x) = -x^2 + 120x - 2000$, where "P" is the profit and "x" is the price for each coat sold. For what values of "x" does the company make a profit? Graph the equation if necessary.

$-x^2 + 120x - 2000 > 0$

$P > -x^2 + 120x - 2000$

$x = \frac{-120 \pm \sqrt{120^2 - 4(-1)(-2000)}}{-2} = x$

$x = 20 \text{ or } 100$

$20 < x < 100$

5. The height of a rocket is modelled by the equation: $y = -2x^2 + 38x + 10$, where "x" s time in seconds, and "y" is the height in feet. During what interval of time, to the nearest tenth of a second, is the projectile at least 125 ft above ground?

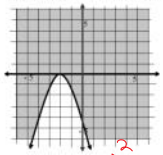
$125 \leq -2x^2 + 38x + 10$

$0 \leq -2x^2 + 38x - 115$

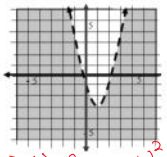
$\frac{-38 \pm \sqrt{38^2 - 4(-2)(-115)}}{-4}$

$\frac{-38 + \sqrt{524}}{-4} \leq x \leq \frac{-38 - \sqrt{524}}{-4}$

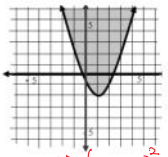
6. Find an inequality that best describes each graph:



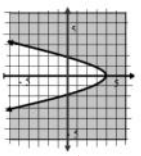
$y \leq (x+2)^2$



$y > 2(x-1)^2 - 3$



$y \geq (x-1)^2 - 2$



$x \leq -(y)^2 + 4$