Quadratics. Name_____

1. Let $y = x^2$. The smallest value that y can take on is _____, which it takes if x is _____.
2. Let $y = (x-2)^2$. The smallest value that y can take on is _____, which it takes if x is _____.
3. Let $y = (x-2)^2 + 5$. The smallest value that y can take on is _____, which it takes if x is _____.
4. Let $y = x^2 - 4x + 9$. The smallest value that y can take on is _____, which it takes if x is _____. Hint: convince yourself, by multiplication, that the equation in number 3 is exactly the same as the equation in number 4. Therefore the answer is obvious.

5. Let $y = x^2 + 6x - 1$. The smallest value that y can take on is _____, which it takes if x is _____. Hint: rewrite the equation so that it looks like the ones in 1 through 3. Start by noting that $(x+3)^2 = x^2 + 6x + 9$ and make the proper adjustment by subtracting 10 so that the equations are the same.

6. Let $y = x^2 - 8x + 5$. The smallest value that y can take on is _____, which it takes if x is _____.

7. Let $y = 2x^2 + 8x + 1$. The smallest value that y can take on is _____, which it takes if x is _____. Hint: The leading coefficient is 2, which is somewhat annoying. So factor as $y = 2\left(x^2 + 4x\right) + 1$ and proceed as before, or else divide everything by 2 since y will be the smallest when $\frac{y}{2}$ is.

8. Let $y = -x^2 + 4x + 1$. Does y have a minimum value, or a maximum?_____
9. Find it, and the value of *x* that produces it.

10. Let $y = ax^2 + bx + c$. y will have a minimum value if *a* is _____ and a maximum if *a* is _____.
11. Find it, and the value of *x* that produces it.