Finding the Vertex of Quadratic Equations

The vertex (x, y) of equations in the form y = ax² + bx + c can be found by letting $x = -\dfrac{b}{2a}$, and y will be whatever you get when you plug x into the equation above.

- Example: y = 3x² + 12x – 5   For the vertex, $x = -\dfrac{b}{2a} = -\dfrac{12}{2(3)} = -\dfrac{12}{6} = -2$.

  Plug in x = –2 into the equation:
  $$y = 3(-2)^2 + 12(-2) - 5 \quad = \quad 3(4) - 24 - 5 \quad = \quad 12 - 29 \quad = \quad -17$$

  So, the vertex is (–2, –17).

Find the vertex of the parabolas given by the equations below.

1. $y = 3x^2 - 24x - 7$

2. $y = x^2 + 6x + 3$

3. $y = -2x^2 - 8x + 10$

4. $y = 2x^2 - 16x + 1$

5. $y = 3x^2 - 24x - 15$

6. $y = -x^2 + 5x + 1$

7. $y = -4x^2 + 8x - 1$

8. $y = 6x^2 + 12x + 6$

9. $y = 2x^2 - 2x + 5$

10. $y = x^2 - 7x + 2$

11. $y = 2x^2 - 5x - 3$

12. $y = -2x^2 + 3x - 6$