Anti-Quiz # 9

For the function $f(x) = -x^2 + 6x - 3$,
(a) Compute the $y$-intercept.
(b) Compute the maximum or minimum value and state whether it is the maximum or the minimum.
(c) What value of $x$ corresponds to this maximum or minimum?

**SOLUTION.**

For this quadratic function, $A = -1$, $B = 6$, and $C = -3$.
(a) The $y$-intercept is $f(0) = -3$.
(b) This parabola is open down because of the negative $A$. Therefore, it has the **maximum** value

$$k = C - \frac{B^2}{4A} = -3 - \frac{6^2}{4(-1)} = -3 + 9 = 6$$

(c) This maximum is attained at

$$x = h = -\frac{B}{2A} = -\frac{6}{2(-1)} = 3$$

For the function $f(x) = -x^2 - 6x - 5$,
(a) Compute the $y$-intercept.
(b) Compute the maximum or minimum value and state whether it is the maximum or the minimum.
(c) What value of $x$ corresponds to this maximum or minimum?

**SOLUTION.**

For this quadratic function, $A = -1$, $B = -6$, and $C = -5$.
(a) The $y$-intercept is $f(0) = -5$.
(b) This parabola is open down because of the negative $A$. Therefore, it has the **maximum** value

$$k = C - \frac{B^2}{4A} = -5 - \frac{(-6)^2}{4(-1)} = -5 + 9 = 4$$

(c) This maximum is attained at

$$x = h = -\frac{B}{2A} = -\frac{-6}{2(-1)} = 3$$