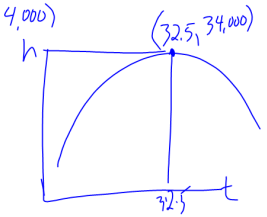
50. AEROSPACE NASA's KC135A aircraft flies in parabolic arcs to simulate the weightlessness experienced by astronauts in space. The height h of the aircraft (in feet) t seconds after it begins its parabolic flight can be modeled by the equation $h(t) = -9.09(t - 32.5)^2 + 34{,}000$. What is the maximum height of the aircraft during this maneuver and when does it occur?

Vertex $(32.5, 34{,}000)$

max: 34,000 ft

32.5 sec



(41) $y = 4x^2 + 24x$

$y = 4(x^2 + 6x + 9) - 9(4)$

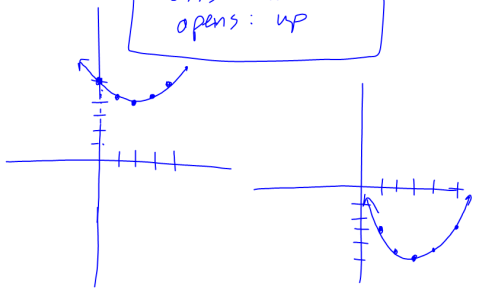
$\frac{6}{2} = 3$, $3^2 = 9$

$y = 4(x+3)^2 - 36$

Vertex $(-3, -36)$

axis: $x = -3$

opens: up



(23) $y = (-x^2 - 4x) + 8$

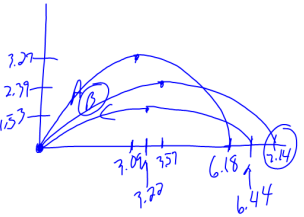
$y = -(x^2 + 4x + 4) + 8 - \cancel{4(-1)}$ (+4)

$y = -(x+2)^2 + 12$

A $(3.09, 3.27)$

B $(3.57, 2.39)$

C $(3.22, 1.53)$



(2, −1) down

$y = a(x-h)^2 + k$

$y = -(?)(x-2)^2 - 1$

Product Property

$x^2 \cdot x^4 = x^6$

$x^m \cdot x^n = x^{m+n}$

$x^8 \cdot x^{10} = x^{18}$

$x^7 \cdot x^{-3} = x^4$

Quotient Property

$\frac{x^m}{x^n} = x^{m-n}$

$\frac{x^5}{x^2} = \frac{1 \cdot 1 \cdot x \cdot x \cdot x}{1 \cdot 1} = x^3$

$\frac{x^{15}}{x^8} = x^7$