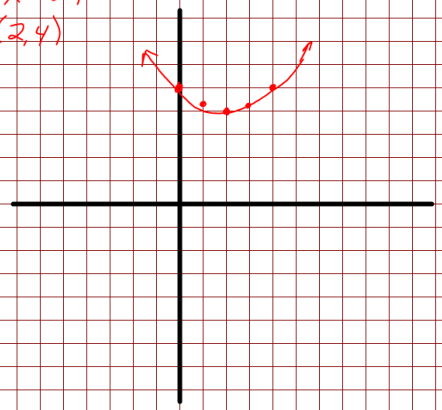
(15) $y = \frac{1}{4}(x-2)^2 + 4$

vertex (2, 4)

x	y
0	5
1	$4\frac{1}{4}$
2	4
3	$4\frac{1}{4}$
4	5



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

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

$\frac{4}{2} = 2 \quad 2^2 = 4$

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

vertex: $(-2, 12)$
axis: $x = -2$
opens: down

(24) $y = (x^2 - 6x) + 1$

$y = (x^2 - 6x + \underline{9}) + 1 - 9$

$\frac{-6}{2} = -3 \quad (-3)^2 = 9$

$y = (x-3)^2 - 8$

vertex: $(3, -8)$
axis: $x = 3$
opens: up

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

$y = 4(x^2 + 6x + \underline{9}) - 9(4)$

$\frac{6}{2} = 3$

$3^2 = 9$

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

vertex $(-3, -36)$

axis: $x = -3$

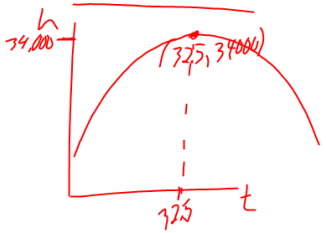
opens: up

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 $(32.5, 34000)$

max: 34,000

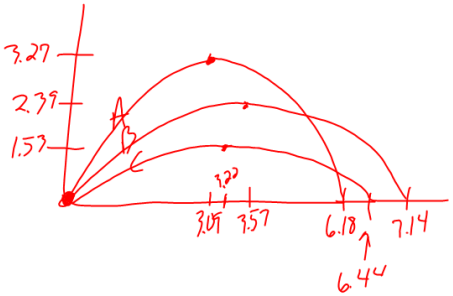
32.5 sec



A $(3.09, 3.27)$

B $(3.57, 2.39)$

C $(3.22, 1.53)$



vertex $(2, -1)$

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

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