Name: Key Hr: _____

3.3A Writing Quadratic Equations Given Three Points or a Vertex and a Point

Find an equation in standard form of the parabola passing through the points.

1. $(1,-1),(2,-5),(3,-7)$

$y = x^2 - 7x + 5$

2.

x	F(x)
-2	-1
2	-1
3	9

$y = 2x^2 - 9$

3. The table shows the number n of tickets to a school play sold t days after the tickets went on sale, for several days.

Day, t	Number of tickets sold, n
1	32
3	64
4	74

a. Find a quadratic equation for the data

$n(t) = -2t^2 + 24t + 10$

b. Use the equation to find the number of tickets sold on day 7

max

$n(7) = -2(7)^2 + 24(7) + 10 = 80$ tickets

c. When was the greatest number of tickets sold?

vertex

$\left(\frac{-b}{2a}, -\right) \quad \frac{-24}{2(-2)} = \frac{-24}{-4} = 6$

$n(6) = 82$

day 6, 82 tickets

$y = -2x^2 + 24x + 10$ or $n = -2t^2 + 24t + 10$

4. The table gives the number of skis sold in a sporting goods store for several months last year.

Month, t	Number of pairs of skis sold, s
(Jan)1	82
(March)3	42
(May)5	18

a. Find a quadratic equation for the data.

$s(t) = 2t^2 - 28t + 108$

b. Use the equation to predict the number of skis sold in November. month 11

$t = 11 \quad s(11) = 2(11)^2 - 28(11) + 108 = 42$ skis

c. In what month was the fewest number of skis sold?

min (vertex)

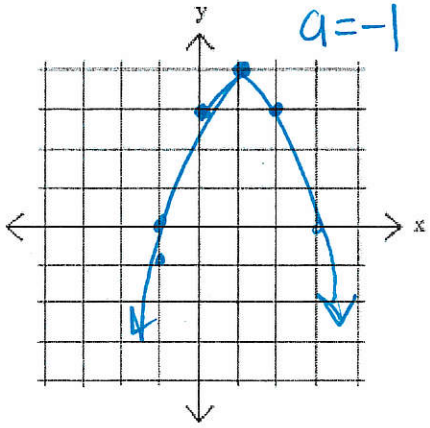
$\frac{28}{2(2)} = 7 \rightarrow$ July! 10 skis $\quad (7, s(7)) = (7, 10)$

Find an equation for a quadratic function given the following information. Then sketch a graph.

5. Vertex: (1, 4) and a point (2, 3) (h k) (x y)

$y = -(x-1)^2 + 4$

$a = -1$



6. Vertex: (3, 1) and a point (-1, 5) (h k) (x y)

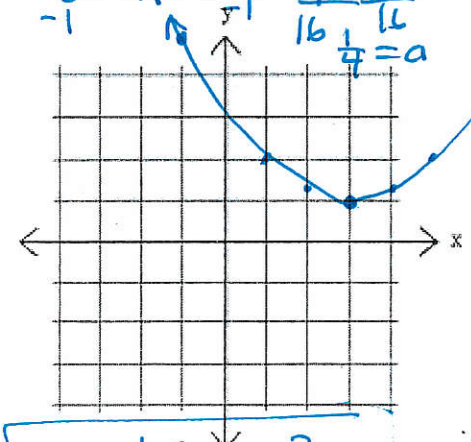
$5 = a(-1-3)^2 + 1$

$5 = a(16) + 1$

$-1 \quad -1$

$\frac{4}{16} = \frac{16a}{16}$

$\frac{1}{4} = a$



$y = \frac{1}{4}(x-3)^2 + 1$

7. Vertex: (2, -3) and y-intercept of -2 (h k) (x y) (0, -2)

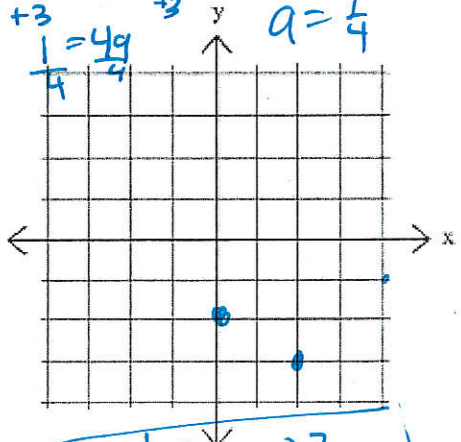
$-2 = a(0-2)^2 - 3$

$-2 = 4a - 3$

$+3 \quad +3$

$\frac{1}{4} = \frac{4a}{4}$

$a = \frac{1}{4}$



$y = \frac{1}{4}(x-2)^2 - 3$

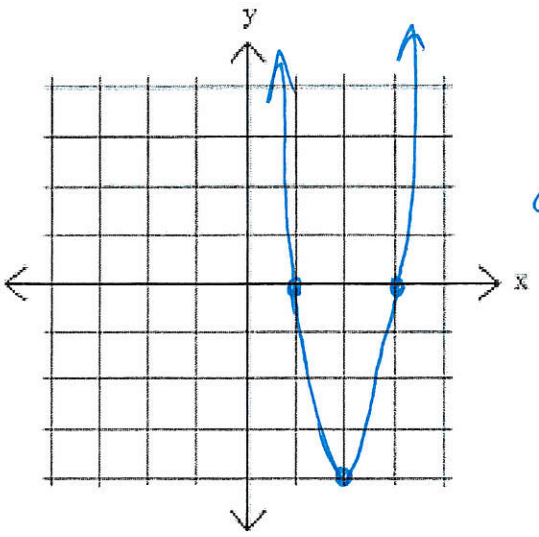
8. Use the information provided to find the following:

h k
Vertex: (2, -4) and x-intercept of 1 (x, y) (1, 0)

A) The equation for the quadratic function.

$y = 4(x-2)^2 - 4$

B) Sketch a graph.



a=4

C) State the domain and range

D: $(-\infty, \infty)$
R: $[-4, \infty)$

D) Determine if there is a max or min

min

$0 = a(1-2)^2 - 4$

$0 = a(-1)^2 - 4$

$0 = a(1) - 4$

$0 = a - 4$

$+4 \quad +4$

$4 = a$