

Name Key

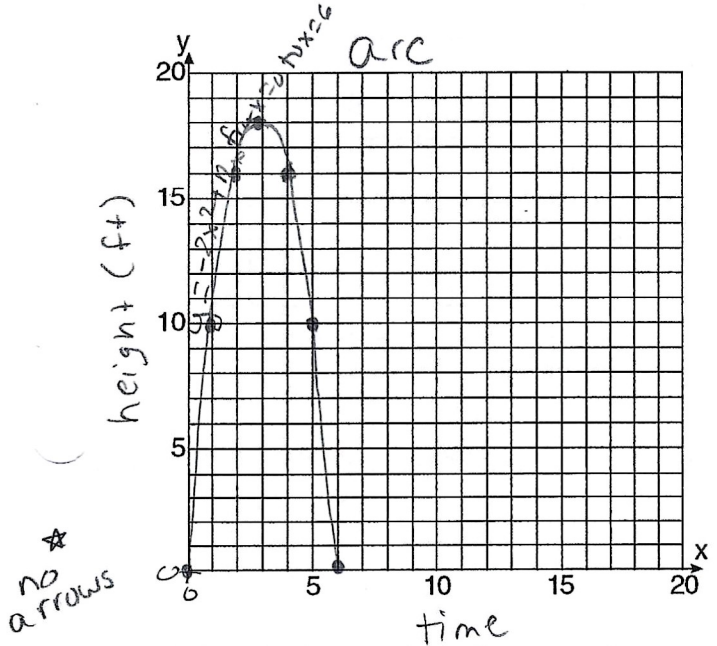
Date _____

8A: Algebra 1

Period _____

Parabola Word Problems Homework

- 1) An arch is built so that it is 6 feet wide at the base. Its shape can be represented by a parabola with the equation $y = -2x^2 + 12x$, where y is the height of the arch.



- (a) Graph the parabola from $x = 0$ to $x = 6$. [Show all work.]

- (b) Determine the maximum height, y , of the arch.

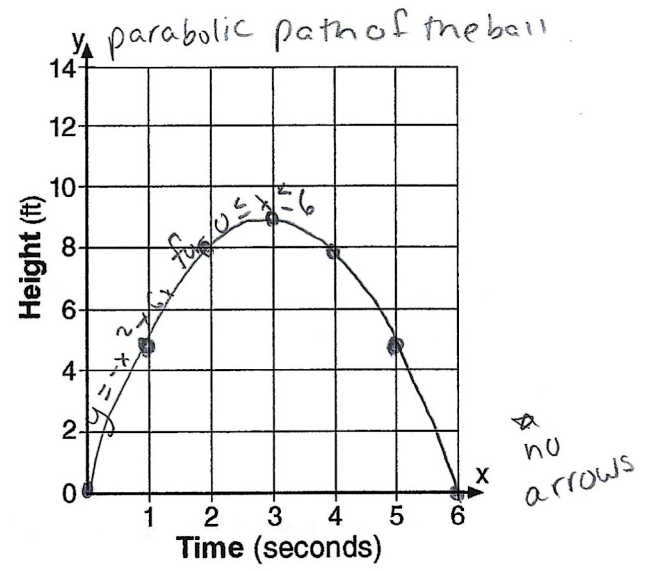
(a)

x	y
0	0
1	10
2	16
3	18
4	16
5	10
6	0

(b) $y = 18$ ft
 (y-value of the T.P.)

- 2) Amy tossed a ball in the air in such a way that the path of the ball was modeled by the equation $y = -x^2 + 6x$. In the equation, y represents the height of the ball in feet and x is the time in seconds.

- (a) Graph $y = -x^2 + 6x$ for $0 \leq x \leq 6$. [Show all work.]



- (b) At what time, x , is the ball at its highest point?

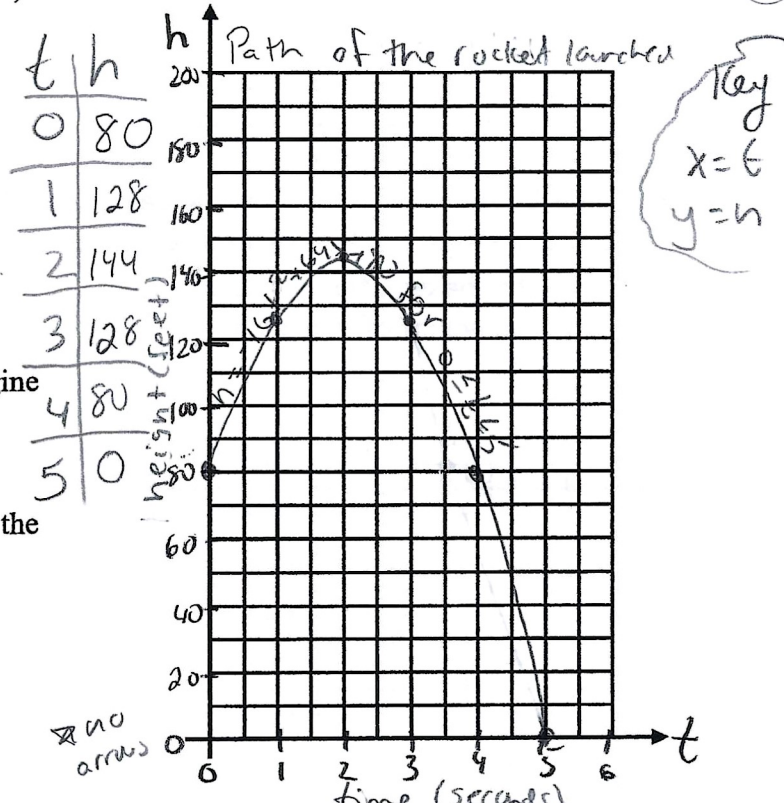
(a)

x	y
0	0
1	5
2	8
3	9
4	8
5	5
6	0

(b) $x = 3$ seconds
 (x-value of T.P.)

Exercise # 3) On top of a hill, a rocket is launched from a distance 80 feet above a lake. The rocket will fall into the lake after its engine burns out. The rocket's height, h , in feet above the surface of the lake is given by the equation, $h = -16t^2 + 64t + 80$, where t is time in seconds.

(a) Graph h on your calculator for $0 \leq t \leq 5$.



(b) What is the maximum height of the rocket?

144 ft. (y-value of TP)

(c) How long does it travel upward before its engine burns out?

2 seconds (x-value of TP)

(d) After how many seconds will the rocket hit the lake?

5 seconds
 (2nd time y=0)

4) If a toy rocket is launched vertically upward from ground level with an initial velocity of 128 feet per second, then its height h after t seconds is given by the equation $h(t) = -16t^2 + 128t$ (if air resistance is neglected).

a. How long will it take for the rocket to return to the ground?

8 seconds (2nd time y=0)

b. After how many seconds will the rocket be 112 feet above the ground?

at 1 seconds and again at 7 seconds

c. How long will it take the rocket to hit its maximum height?

4 seconds (x-value of T.P.)

d. What is the maximum height?

256 ft (y-value of T.P.)

Key
 $x = t$
 $y = h(t)$

t	h(t)
0	0 → ground
1	112
2	192
3	240
4	256
5	240
6	192
7	112
8	0 → ground

