Name: **Key**   Date: _____

Unit **9**   Lesson 2

Now: Using your calculator, complete the table for $f(x) = x^2 - 10x (+21)$ ← y-int

x	y
2	5
3	0
4	-3
T.P. 5	-4
6	-3
7	0
8	5

a. Identify the roots.

$\{3, 7\}$
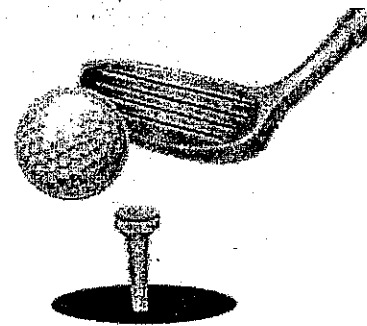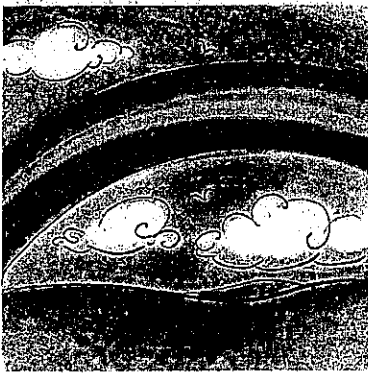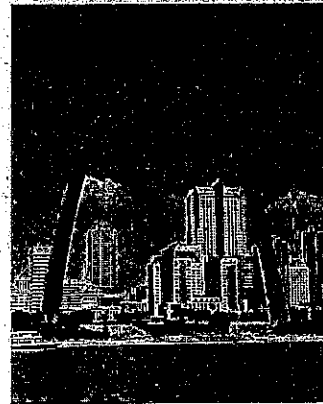
b. What is the vertex?

T.P. = (5, -4)

c. Is the vertex maximum or minimum?

minimum

d. d. What is the y-intercept?

21

*Extra credit: Create a poster, power point, or model to display real-life application of quadratic functions. The project is worth up to 3 points. **Be Creative!** Project is due ___Friday April 21st___
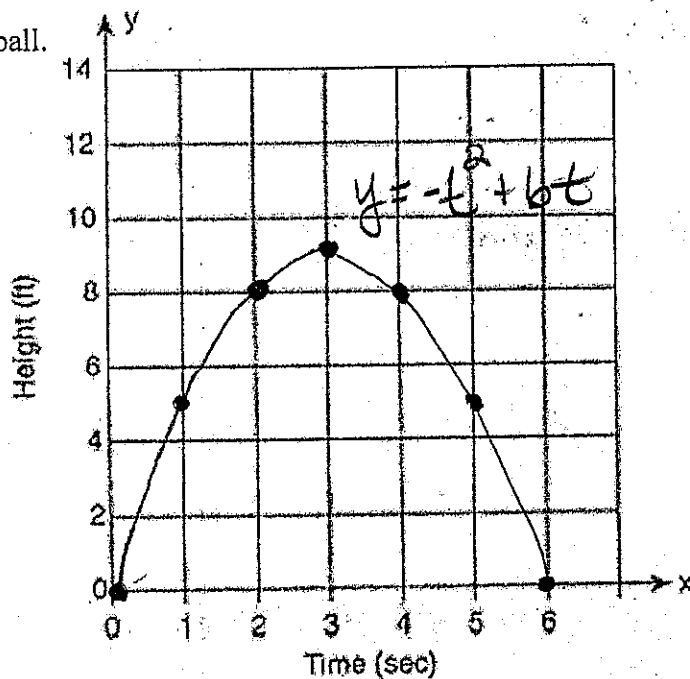
Aim: Graphing Real Life Quadratic Equations

1. Joe Flaco tossed a football to Rob Bolden during Super Bowl 47. The arch that the ball makes is in the shape of a parabola with equation $h(t) = -t^2 + 6t$. Where t represents the time, in seconds and $h(t)$ represents the height, in feet.
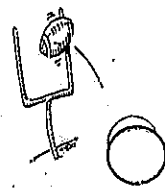
   a) Fill in the table and graph the path of the football.

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

R_1 (0,0)   TP (3,9) R_2 (6,0)

$y = -t^2 + 6t$

b) At what time does the ball start and end? What are these points called?

$(0,0)$ & $(6,0)$ → Roots

c) At what point does the football start to decline again?

$(3,9)$ Turning Point

d) Is this a maximum or minimum point?

maximum

e) What is the maximum height of the football in feet?

9 ft.

f) Explain the meaning of the vertex in the context of the problem.

At 3 seconds the football is at a height of 9 ft.
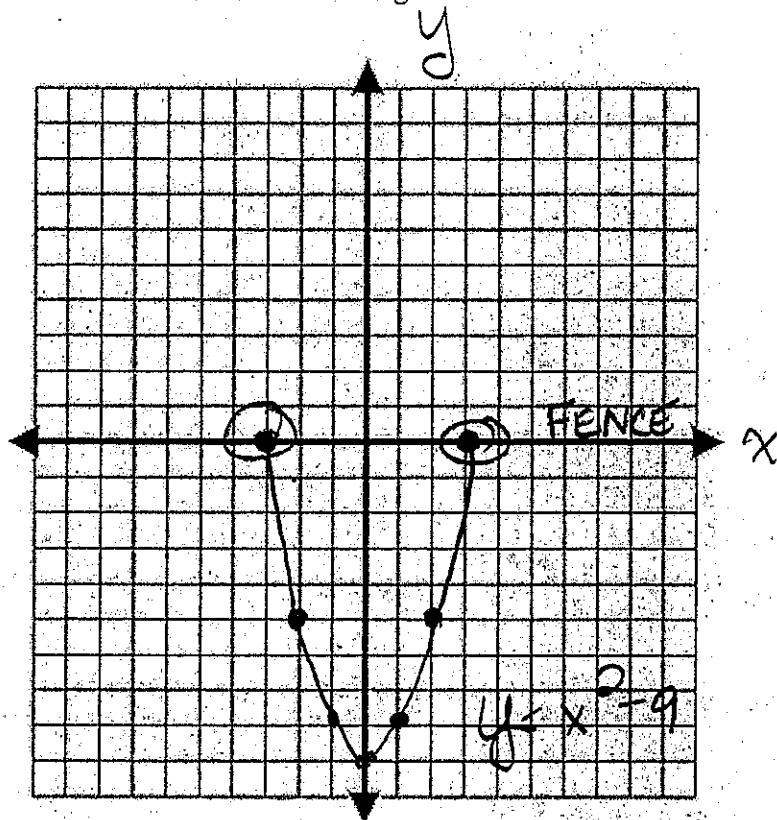
g) State the increasing interval.

$(0,3)$

h) State the decreasing interval.

$(3,6)$

2. Lori and Anthony are taking Lia and Ryan to the park. At the park there is a swing that hangs in the shape of a parabola with the equation $f(x) = x^2 - 9$. There is a fence behind the swing.

a. Graph the shape of the swing.

x	y
R₁ $\boxed{-3}$	0
-2	-5
-1	-8
T.P $\boxed{0}$	-9
1	-8
2	-5
R₂ $\boxed{3}$	0

$y = x^2 - 9$

FENCE

b. Looking at the graph, where does the swing hit the fence?
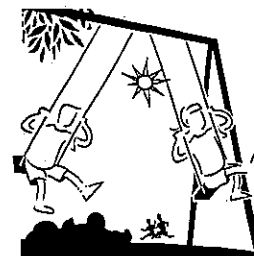
$\{-3, 3\}$

c. What is the lowest point of the swing?

$(0, -9) \rightarrow T.P$

d. State the increasing interval.

$(0, 3)$

e. State the decreasing interval.
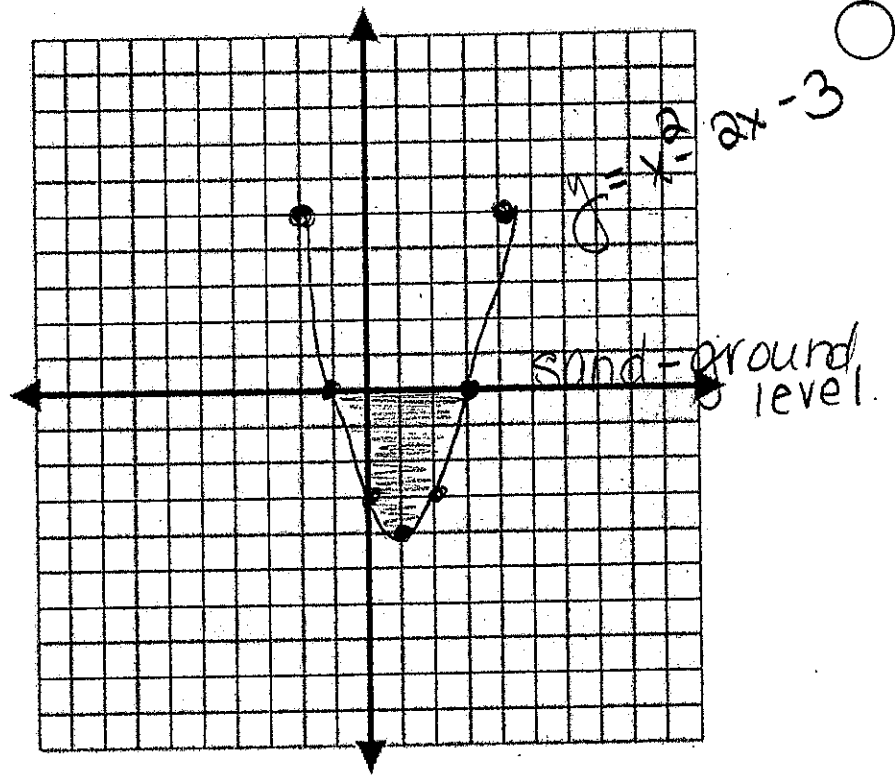
$(-3, 0)$

3. Michael, Andrew, Luca, Lia, and Ryan are digging a hole in the sand at ToBay beach. The side-view of the hole is in the shape of the quadratic equation $f(x)=x^2-2x-3$

a) Graph the side-view of the hole.

x	y
-2	5
-1	0
0	-3
1	-4
2	-3
3	0
4	5

R₁

P

2₂

$y=x^2-2x-3$

sand=ground level.

b) How wide is the opening of the hole in feet?

4 ft.

c) How deep is the hole in feet?

4 ft.

d) If the y-axis is an umbrella pole that is in the ground, how many feet below ground level does the umbrella hit the hole?

3 ft.

e) State the domain & range in interval notation.

Domain: [-2, 4]

Range: [-4, 5]