

Name \_\_\_\_\_

Per \_\_\_\_\_

Int.2 Ch.4 Fountain Project (100pts)

Due Date: M/T November 22/23

From Ryan Martine and Eric Harding

You will design a water fountain for a new subdivision near the new high school.

The water fountain will contain at least two intersecting parabolic water arcs that meet these requirements:

- The water arcs will start at the ground level.
- Arcs should reach a minimum height of 50 feet and a maximum height of 200 ft.
- Water speed must be between 20 ft/sec and 130 ft/sec.
- The initial angle of the arc must be between  $15^\circ$  and  $85^\circ$
- Arcs must intersect in at least 2 places above the ground.
- The pool that contains the fountain has a maximum size of  $400 \text{ ft}^2$
- The two arcs must have different angles and velocities.
- The equation for the water arcs is on Pg. 192

Part 1. (60pts Total)

Your project must be mounted on a poster and include the following things:

1. A detailed artist's drawing of the entire fountain with all water arcs drawn to scale. (15pts)
2. A graph of the water arcs drawn to scale on graph paper – (separate from the artist's drawing).
  - A) Label coordinates of the intersection of the arcs with the ground and the max height. (6pts)
  - B) Label the coordinates of the intersection points of the arcs. (4pts)
  - C) Include all calculations for finding the coordinates of the intersection points. (15pts)
3. A separate graph of each of the water arcs – (must start at the origin).
  - A) Label the coordinates of the vertex and the x-intercepts. (6pts)
  - B) With each graph, include all the calculations for:
    - i) The equations of each arc (MUST BE IN STANDARD FORM). (10pts)
    - ii) The measures of the initial angles of each arc. (2pts)
    - iii) The water speeds of each arc. (2pts)

Part 2. (40pts Total)

The following problems MUST accompany your poster as a mathematical verification of the equations used to sketch your water arcs. (Do NOT mount them to your poster.) These problems must be complete, and in order.

Pg. 192 #37-40 (14pts)

(Include sketches of all arcs along with maximum height and distance of each arc on #38 and #40)

Pg. 198 #29 (2pts)

Pg. 205 #39 (3pts)

Pg. 213 #45 (8pts)

Pg. 229 #53 (8pts)

Pg. 235 #30 (5pts)