

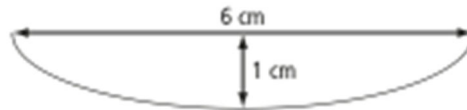
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Learning Goal 3.2

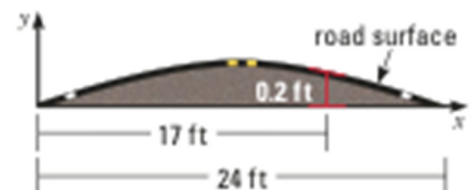
Given a quadratic function, identify the characteristics of graphs, including domain, range, intercepts, vertex and the axis of symmetry.

Example Parabolic mirrors are often used in lights because they give a focused beam. Suppose a parabolic mirror is 6 cm wide and 1 cm deep, as shown.



- Suppose the vertex of the mirror is at the origin. Determine the quadratic function in vertex form that describes the shape of the mirror.
- Now suppose the origin is at the left outer edge of the mirror. Determine the quadratic function in vertex form that describes the mirror.

Example The surfaces of some roads are shaped like parabolas to allow rain to run off to either side. Write a quadratic model for the surface of the road shown.

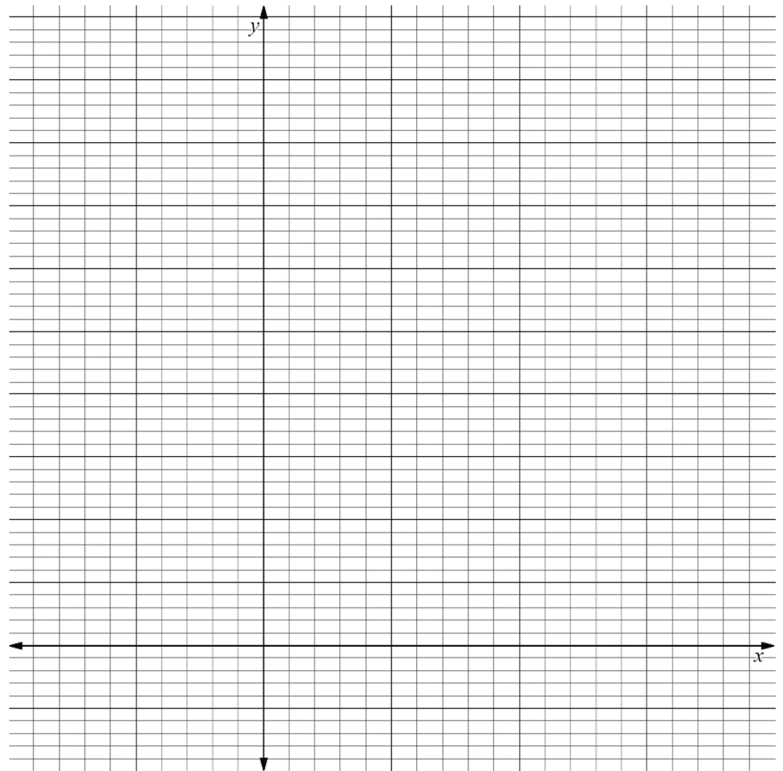


Example A student council currently sells memberships for \$6 per year and has 700 members. To increase revenue, they decide to increase the membership cost. The results of a survey indicate that 50 fewer students will buy a membership for every \$1 increase in the membership cost.

- a. Write a quadratic function in standard form to model this situation.

- b. What are the coordinates of the vertex? What information does it give the student council?

- c. Graph the quadratic function. What does the shape of the graph communicate about the situation?



- d. Determine if there are any x-intercepts that are relevant. What do these intercepts, if they exist, represent in the situation?

- e. What domain and range are logical for this situation? Explain.

