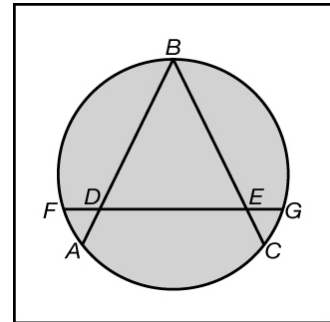


Home and Garden Improvements

People often improve the insides or outsides of their homes. Planning these improvements carefully is very important. Geometry can play a role in planning improvements.

1. This diagram shows a square region off to the side of the Mandez family's patio. In it, is a circular fish pond. \overline{AB} , \overline{BC} , and \overline{FG} are narrow bridges across the pond. In the diagram $AB = BC$, $AD = EC = 1.4$, $DE = 5.7$, $FD = EG$, and $FG = 8.1$. (All measurements are in feet.)

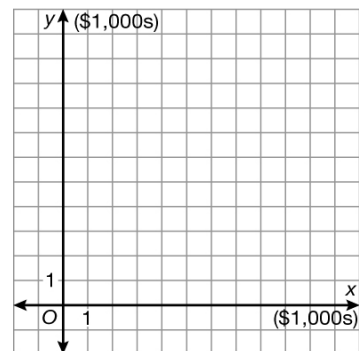


- a. To the nearest tenth, find BD and BE . Show your work. Round the answers to the nearest tenth as necessary.

- b. Classify $\triangle ABC$ and $\triangle DBE$. Justify your response.

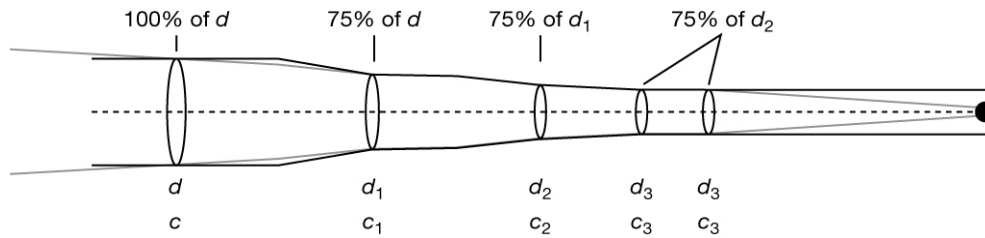
2. The Jackson family is considering improvements to their kitchen and to their bathroom. Let x represent the projected cost in thousands of dollars of improving the kitchen and y represent the cost in thousands of dollars of improving the bathroom. This system of inequalities shows the constraints on what they can spend.

$$\begin{cases} x + y \leq 10,000 \\ 2,000 \leq x \leq 6,000 \\ 2,000 \leq y \leq 7,000 \end{cases}$$



- a. Graph the inequalities on this grid.
- b. Contractor A estimates that the kitchen improvements will cost \$5,110.50 and that the bathroom improvements will cost \$4,800.70. Contractor B estimates that the kitchen improvements will cost \$5,410.50 and that the bathroom improvements will cost \$4,700.00. Which contractor's proposal would meet the Jackson family's constraints? Explain.

3. This diagram shows an arrangement of pipes needed for the Jackson home. Reducers are used to make a transition from a pipe section with a given diameter to a pipe section with a smaller diameter. In the diagram, pipe diameter changes from d to d_1 to d_2 to d_3 .

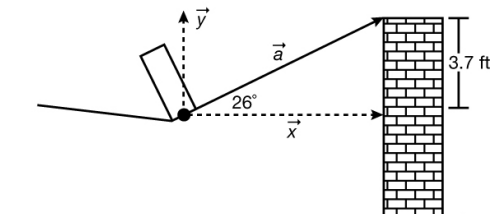


- a. Write the ratio of the diameter of circle c_3 to that of circle c . Show your work.

- b. Write the ratio of the area of circle c_3 to that of circle c . Show your work.

4. This diagram shows a retaining wall, a downward slope, then an upward slope.

Write the horizontal and vertical components of \vec{a} (vectors \vec{x} and \vec{y}).



5. Ms. Edie decided to replace a window.

- a. On this grid, expand the length and width of the rectangle in black by a factor of 2, keeping the lower-left corner where it is.
- b. On this grid, translate the image drawn in part a to the right 7 units and up 1 unit.
- c. One vertex of the black rectangle is $(1, 5)$. Describe how to use transformations to get the final image of $(1, 5)$.

