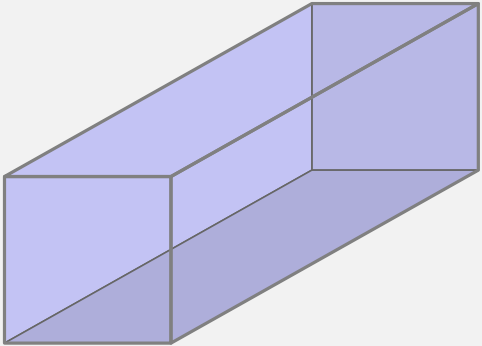
§3.6: APPLIED OPTIMIZATION

Dr. Janssen

Lecture 21

How can we use calculus to model and optimize a given situation?

PREVIEW ACTIVITY 3.4.1



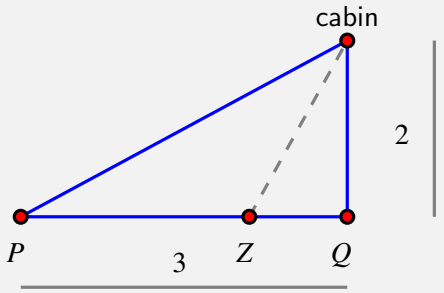
STRATEGIES FOR SOLVING APPLIED PROBLEMS

- Draw a picture and introduce variables–what quantities can vary?
- Identify the quantity to be optimized
- Determine a function of a single variable that models the quantity to be optimized *relationship to other vars?*
- What is the domain of the function to be optimized? What does physics dictate?
- Use calculus to optimize
- Answer the original question

ACTIVITIES 3.6.2–3.6.3

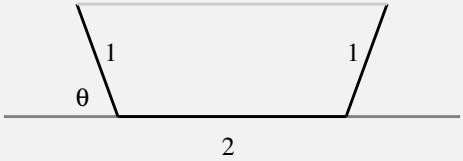
Hint for 3.6.2: The volume of a right circular cylinder with radius r and height h is $V = \pi r^2 h$; its surface area is $SA = 2\pi rh + 2\pi r^2$ (why?).

Hint for 3.6.3: Distance = rate $\times$ time



Day II

ACTIVITIES 3.6.4–3.6.5



BONUS!

We have $45m^2$ of material to build a box with a square base and no top. Determine the dimensions of the box that will maximize the enclosed volume.