

MA 160
Section 1.1

1. Using “common sense” language, define the following

Line
Point

Curve
Maximum

Continuous
Change

Cost
Chain

A **function** is a rule that assigns to each input exactly one output.

2. When you turn on a hot-water faucet, the temperature T of the water depends on how long the water has been running. Draw a rough graph of T as a function of the time t that has elapsed since the faucet was turned on. Include axes labeled with the variables T and t as part of your graph.

The **domain** of a function is the set of all allowable inputs. The **range** is the set of all possible output values.

3. A café sells its basic coffee in three different cup sizes: 8, 10, and 14 ounces. They charge \$0.22 per ounce for the drinks.
 - a) If the function p is defined so that $p(v)$ is the price of v ounces of coffee, find and interpret the value of $p(10)$.
 - b) What are the domain and range of p ?

4. A rectangular storage container has an open top. The length of its base is twice its width. Material for the base costs \$10 per square meter; material for the sides costs \$6 per square meter.
- a) Draw the box-like storage container, labeling the length (l) and width (w) of the base, and the height (h).

 - b) Express the area of the base in terms of the width of the container.

 - c) Express the cost of material for the base in terms of the width of the container.

 - d) Express the area of the sides in terms of the width and the height.

 - e) Express the cost of material for the sides in terms of the width and the height.

 - f) Express the total cost of materials in terms of the width and the height.

 - g) The volume of the rectangular container is 10 m^3 . Using the fact that $\text{volume} = \text{width} \cdot \text{length} \cdot \text{height}$, express the total cost of materials in terms of the width only.

5. Let $f(x) = x^2 - 1$. What is $f(2)$? $f(-2)$? $f(\text{☺})$? $f(h)$? $f(1+h)$?

Additional vocabulary: continuous function, discrete function, vertical line test