

Domain and Range

Work within a small group to answer these questions. Do not race through the exercises on your own. Always make sure that your entire group feels good about a question and answer before you move to the next exercise. Ask your group mates for explanations if you feel uncertain about something, and offer your explanations to others when you understand an exercise but someone else may not.

1. Take each of the functions below and find their domains. Express each domain *in words* and in *interval notation*.

(a) f , where $f(x) = \frac{3}{x-5}$

(e) ℓ , where $\ell(x) = \sqrt{x+43}$

(b) force , where $\text{force}(y) = \frac{2}{y(y-8)}$

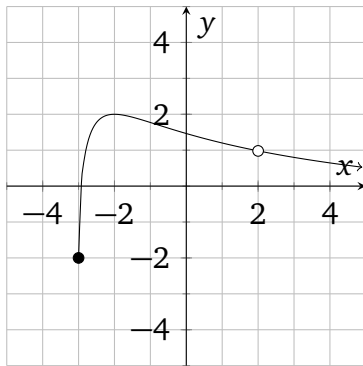
(f) V , where $V(T)$ is the volume of one kilogram of *liquid* water at sea level, where T is the temperature in $^{\circ}\text{C}$.

(c) k , where $k(t) = 20t + 3$

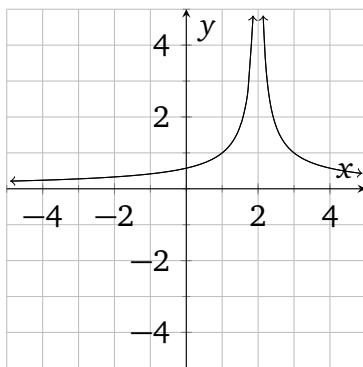
(g) revenue , where $\text{revenue}(n)$ is the revenue at a movie theater when they sell n tickets to a particular show. This theater has 300 seats.

(d) g , where $g(x) = \frac{24}{x^2+1}$

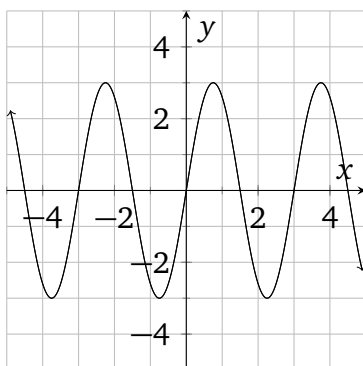
2. A function u has the graphical representation below. Express the domain of u *in words* and in *interval notation*.



3. A function v has the graphical representation below. Express the domain of v *in words* and in *interval notation*.



4. A function named wave has the graphical representation below. Express the domain of wave *in words* and in *interval notation*.



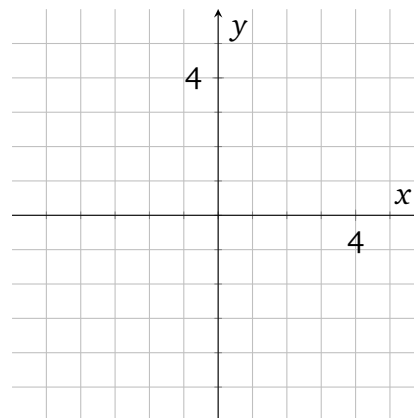
5. An NBA basketball game lasts 48 minutes. Let q be a function of x , where $q(x)$ is the number of points that the home team has x minutes after a particular game begins. For example, if $q(10.5) = 20$ it means that after 10 and a half minutes, the home team has scored 20 points. Express the domain of q *in words* and in *interval notation*.

6. A function g has the symbolic representation $g(x) = |x - 2| - 3$.

(a) Give a numeric representation (table) for g .

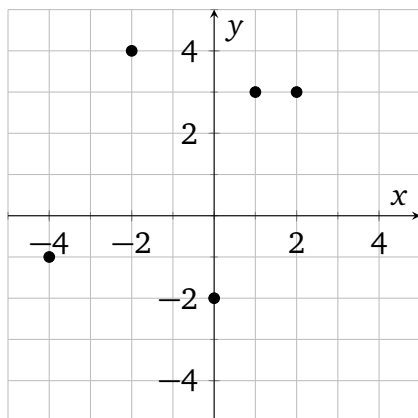
x	$g(x)$
-2	
-1	
0	
1	
2	
3	
4	

(b) Give a graphical representation of g .



(c) Express the domain and range of g in interval notation.

7. A function named Q has the graphical representation below.



$$y = Q(x)$$

(a) Express Q as a set of ordered pairs. Any time you are expressing a *set* or *list*, the standard math notation is to use braces: $\{, \}$.

(b) Express the domain and range of Q in set notation.

8. A function named cost is given by $\{(1, 2), (2, 4), (3, 8), (4, 8), (5, 12)\}$.

(a) What are the domain and range of cost? Give your answers using set notation.

(b) Give a graphical representation of cost.

(c) What is $\text{cost}(2)$?

(d) Solve the equation $\text{cost}(x) = 12$.

9. In order to make table sugar, a factory had to purchase \$20,000 of machinery. Beyond that, there are costs of materials, labor, and transportation that go into producing x pounds of sugar. If $f(x)$ is the total cost in dollars to a factory that will make x pounds of sugar, what are the domain and range for f ?