Example 1.1.1. Suppose Skippy records the outdoor temperature every two hours starting at 6 a.m. and ending at 6 p.m. and summarizes the data in the table below:

time (hours after 6 a.m.)	outdoor temperature in degrees Fahrenheit
0	64
2	67
4	75
6	80
8	83
10	83
12	82

1. Explain why the recorded outdoor temperature is a function of the corresponding time.

2. Is time a function of the outdoor temperature? Explain.

3. Let f be the function which matches time to the corresponding recorded outdoor temperature.

   (a) Find and interpret the following:

   - $f(2)$
   - $f(4)$
   - $f(2+4)$
   - $f(2)+f(4)$
   - $f(2)+4$

   (b) Solve and interpret $f(t) = 83$.

   (c) State the range of f. What is lowest recorded temperature of the day? The highest?

2. Let $h(t) = -t^2 + 3t + 4$.

(a) Find and simplify the following:

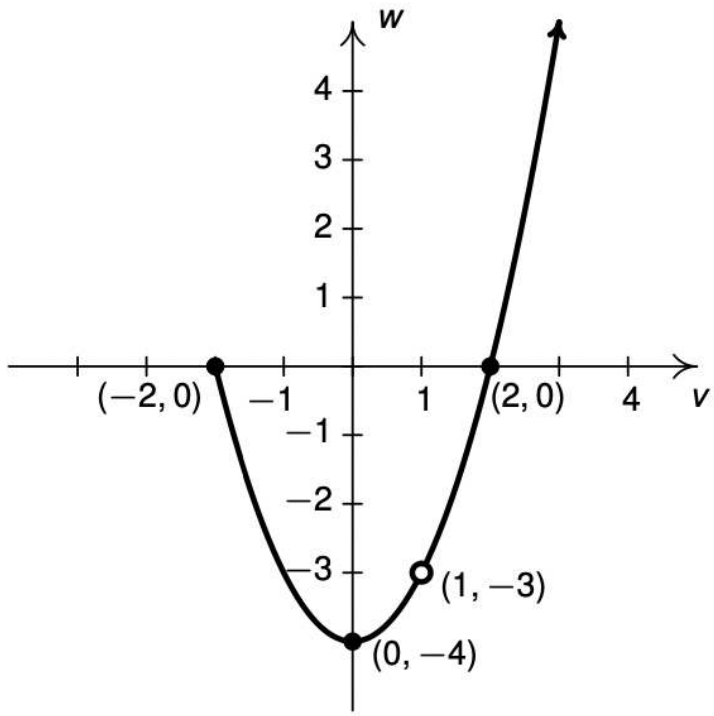
i. $h(-1)$, $h(0)$ and $h(2)$.

ii. $h(2x)$ and $2h(x)$.

iii. $h(t+2)$, $h(t)+2$ and $h(t)+h(2)$.

(b) Solve $h(t) = 0$.

Example 1.1.4. Consider the graph below.



1. (a) Explain why this graph suggests that w is a function of v, $w = F(v)$.

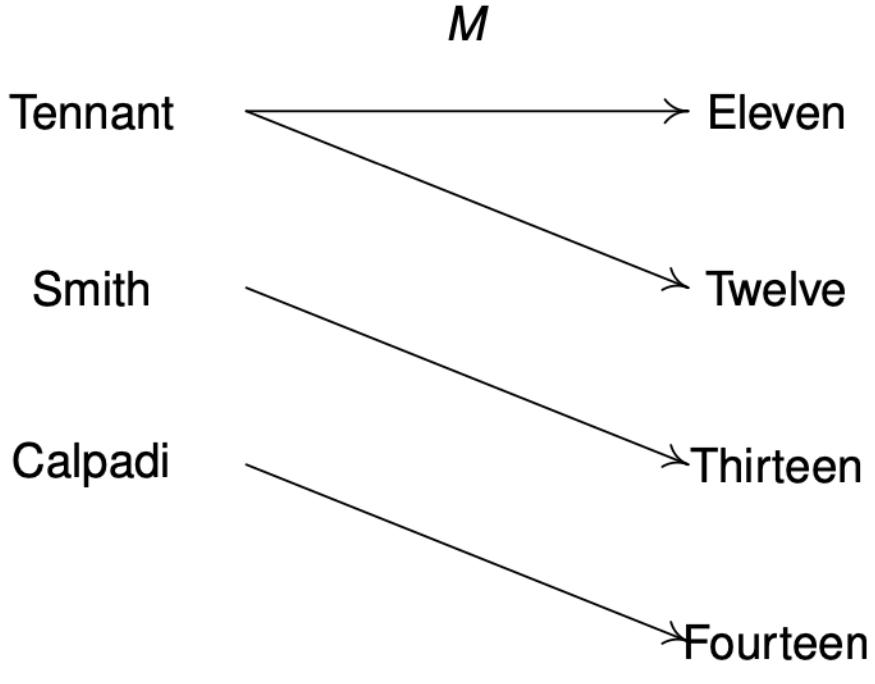
   (b) Find $F(0)$ and solve $F(v) = 0$.

   (c) Find the domain and range of F using interval notation.[14] Find the extrema of F, if any exist.

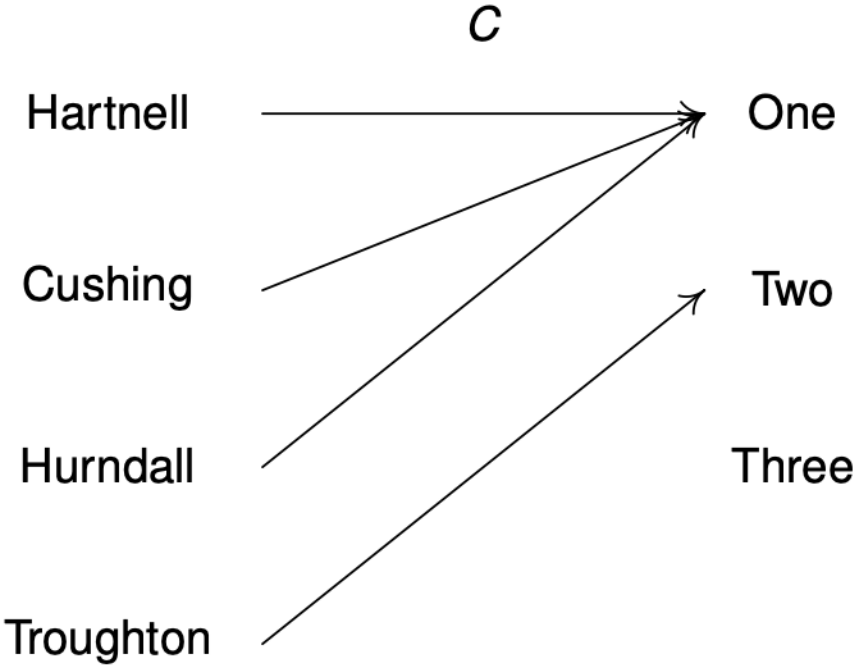
2. Does this graph suggest v is a function of w? Explain.

In Exercises 1 - 2, determine whether or not the mapping diagram represents a function. Explain your reasoning. If the mapping does represent a function, state the domain, range, and represent the function as a set of ordered pairs.

1.



2.



In Exercises 3 - 4, determine whether or not the data in the given table represents y as a function of x. Explain your reasoning. If the mapping does represent a function, state the domain, range, and represent the function as a set of ordered pairs.

3.

x	y
−3	3
−2	2
−1	1
0	0
1	1
2	2
3	3

4.

x	y
0	0
1	1
1	−1
2	2
2	−2
3	3
3	−3

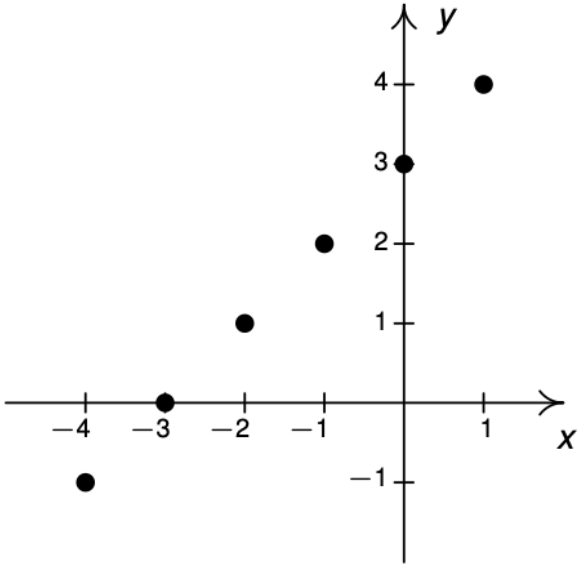
5. Suppose W is the set of words in the English language and we set up a mapping from W into the set of natural numbers $\mathbb{N}$ as follows: word $\rightarrow$ number of letters in the word. Explain why this mapping is a function. What would you need to know to determine the range of the function?

6. Suppose L is the set of last names of all the people who have served or are currently serving as the President of the United States. Consider the mapping from L into $\mathbb{N}$ as follows: last name $\rightarrow$ number of their presidency. For example, Washington $\rightarrow$ 1 and Obama $\rightarrow$ 44. Is this mapping a function? What if we use full names instead of just last names? (**HINT:** Research Grover Cleveland.)

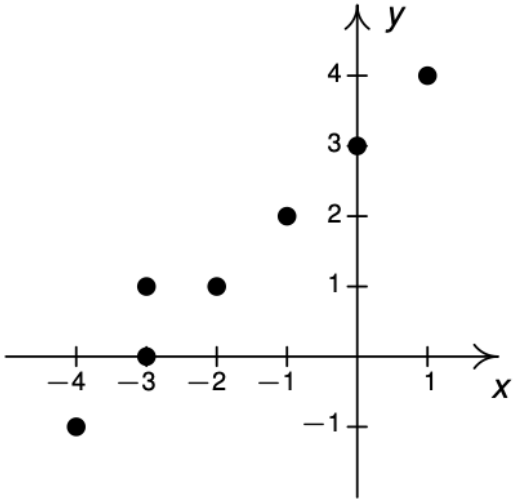
7. Under what conditions would the time of day be a function of the outdoor temperature?

In Exercises 58 - 61, determine whether or not the graph suggests y is a function of x. For the ones which do, state the domain and range.

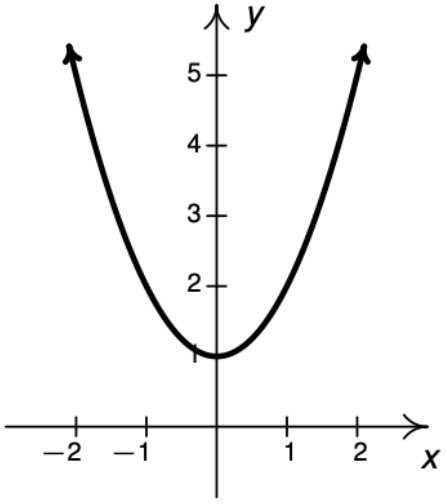
58.



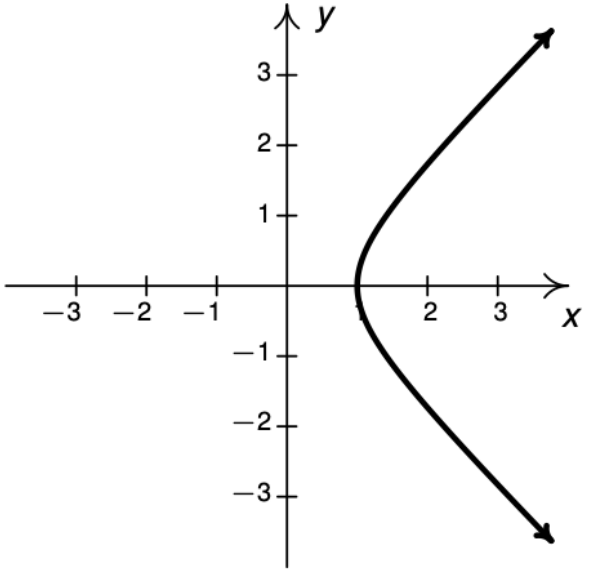
59.



60.

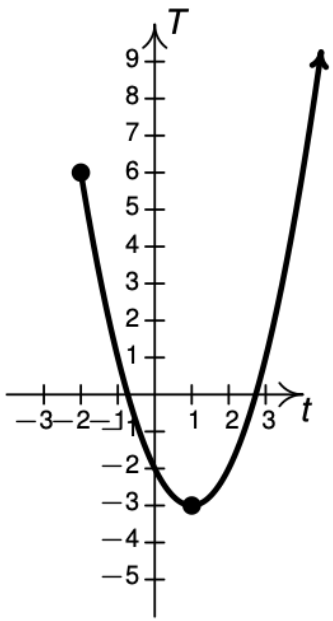


61.

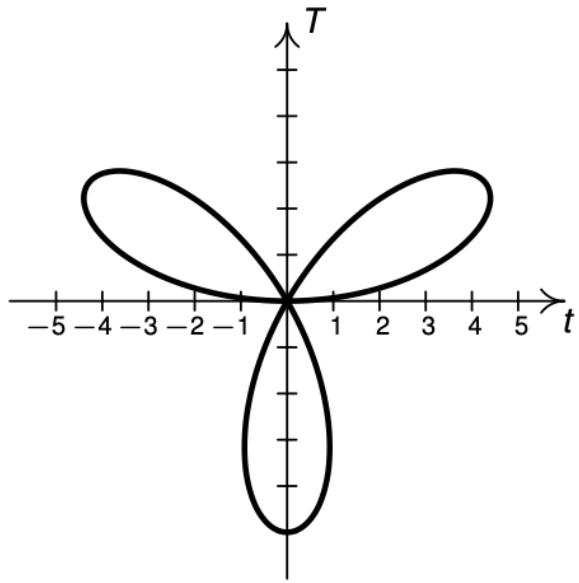


In Exercises 68 - 71, determine whether or not the graph suggests T is a function of t. For the ones which do, state the domain and range.

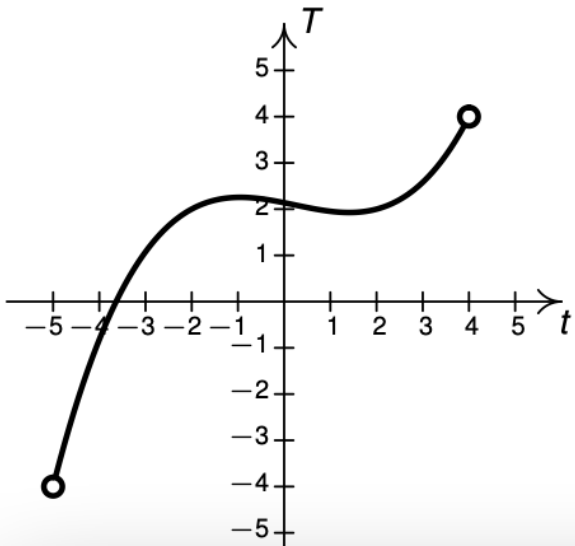
68.



69.



70.



71.