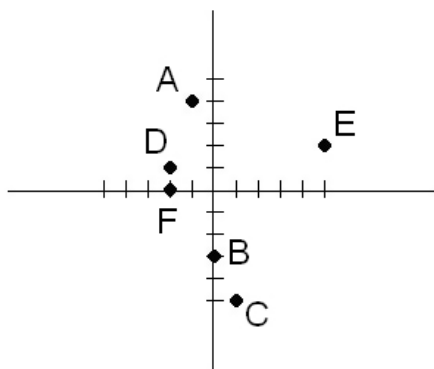


2: Graphical Representations of Functions --- Answers

1.

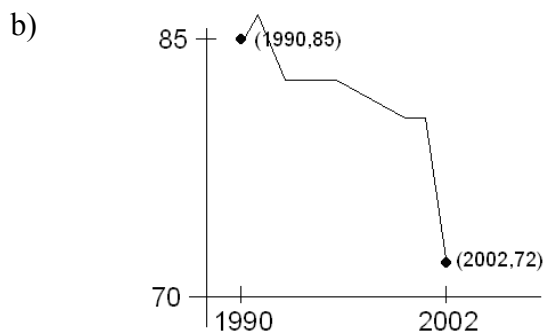
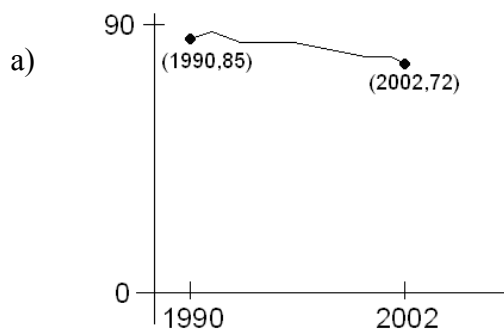


2. Yes. For each input (time) there is at most one output (temperature.)

3.

- a) Horizontal: amount of gasoline; Vertical: cost
- b) Horizontal: horsepower; Vertical: time
- c) Horizontal: day; Vertical: amount of sunlight
- d) Horizontal: age; Vertical: height
- e) Horizontal: year; Vertical: tuition.

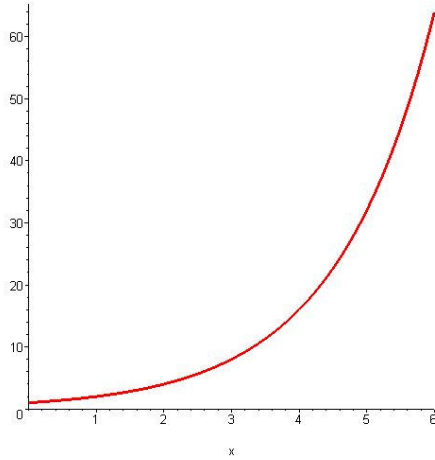
4.



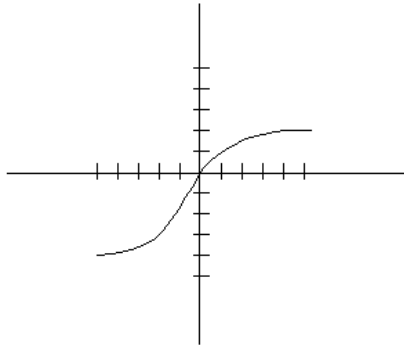
- c) Graph (b) gives a more noticeable decrease since the perceived vertical distance is greater.

5.

- a) The numbers on the vertical scale are not evenly spaced.
- b)



6.



7. If it had two y-intercepts, it would not pass the vertical line test and consequently would fail the definition of a function.

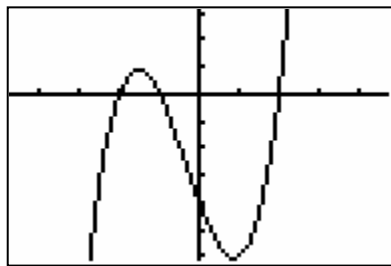
8. Concave down.

9. The 4 would be an x-intercept since the y-value of 0 puts the point is on the x-axis.

10. In WINDOW menu you would change X_{Min} and X_{Max}

11.

a)



The window used was $-4.7 \leq x \leq 4.7$ and $-6.1 \leq y \leq 3.1$.

b) $(-2, 0)$, $(-1, 0)$, $(2, 0)$

12. $x \approx 2.639$

13. $(-3, 9)$, $(2, 4)$

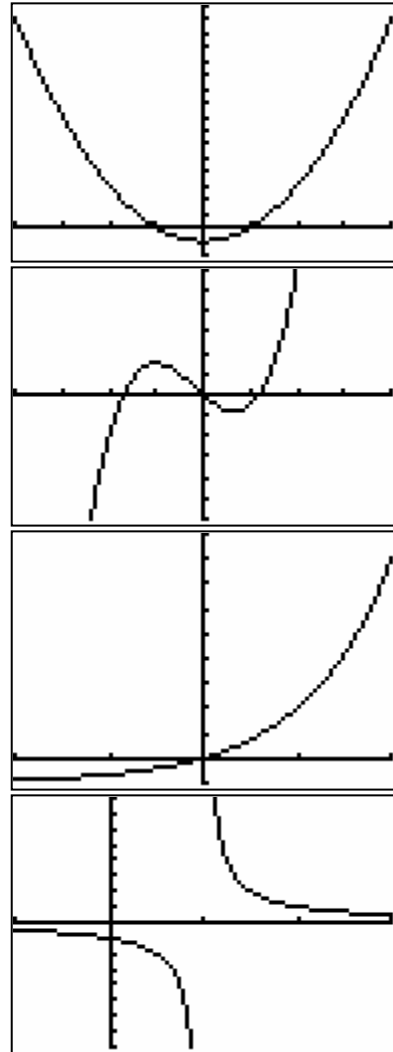
14.

a) The y -intercept is -1 and the x -intercepts are -4 and 4 . The function is increasing for $x > 0$, decreasing for $x < 0$, and always concave up.

b) The y -intercept is 0 and the x -intercepts are 0 , ≈ -1.686 , and ≈ 1.186 . The function is increasing for $x < -1$ and $x > 2/3$. It is decreasing for $-1 < x < 2/3$. It is concave down for $x < 0$ and concave up for $x > 0$.

c) The y -intercept is 0 and the x -intercept is 0 . The function is always increasing and always concave up.

d) The y -intercept is -1 and there are no x -intercepts. The function is always decreasing (except when $x = 1$) and is concave down for $x < 1$ and concave up for $x > 1$.



15.

- a) The function is undefined because the denominator equals zero.
- b) A vertical line.

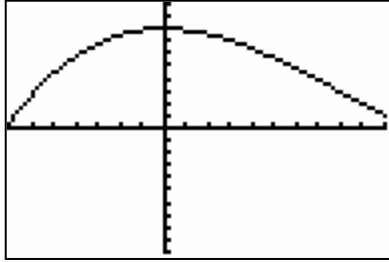
16. You can get an inaccurate view of the graph if you don't have the right input values for the calculator to evaluate.

17.

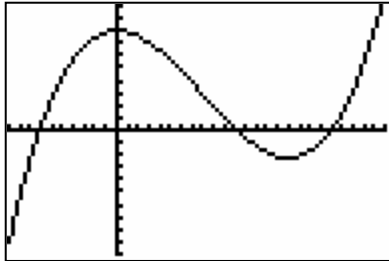
- a) It looks like there is only one.
- b) The x -intercepts are $x = 0$ and $x = 0.1$
- c) The viewing area was too large.

18.

a)



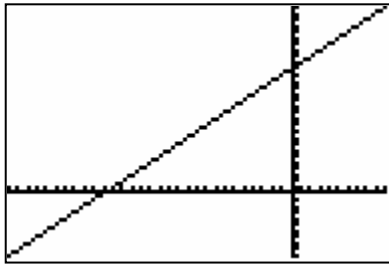
b)



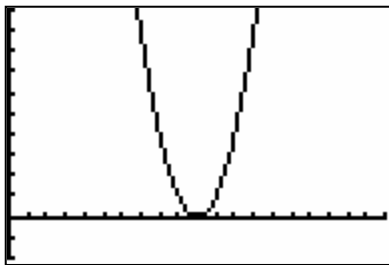
c) The graph in (b) shows more of the key elements of the function.

19.

a) The window used was $-30 \leq x \leq 10$ and $-10 \leq y \leq 30$.



b) The window used was $0 \leq x \leq 20$ and $-2 \leq y \leq 10$



20.

- a) The car is getting closer to the reference point. (The reference point is where the distance equals 0.)
- b) The rate of change is decreasing. Since the graph is decreasing, however, the rate of change is getting more negative. For example, at point A it may be going -30 ft/sec while at point C it may be going -120 ft/sec the rate. This decrease in the rate of change can actually be thought of as “speeding up” (or going faster in a negative direction).
- c) A
- d) C