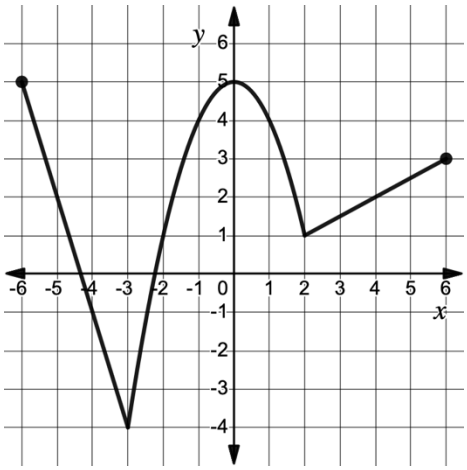
A. The complete graph of a function $f$ is shown.




a. Find $f(4)$.

b. Find all values of $x$ for which $f(x) = 4$.

B. Statistics from the last 10 Superbowl games are given in the table. Determine if each statement is true or false.

| Year | Winner | Total Points | MVP |
|---|---|---|---|
| 2014 | Seattle | 51 | Malcolm Smith |
| 2015 | New England | 52 | Tom Brady |
| 2016 | Denver | 34 | Von Miller |
| 2017 | New England | 62 | Tom Brady |
| 2018 | Philadelphia | 74 | Nick Foles |
| 2019 | New England | 16 | Julian Edelman |
| 2020 | Kansas City | 51 | Patrick Mahomes |
| 2021 | Tampa Bay | 40 | Tom Brady |
| 2022 | LA Rams | 43 | Cooper Kupp |
| 2023 | Kansas City | 73 | Patrick Mahomes |

_____The Winner is a function of the Year.

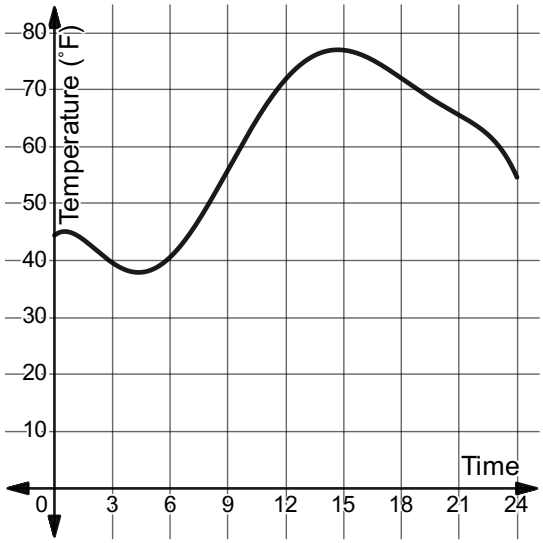
_____The number of Total Points is a function of the Winner.

_____The MVP is a function of the Winner.

_____The MVP is a function of the number of Total Points.

_____The Year is a function of the MVP.

C. The temperature of a town in Southwest Michigan over a 24-hour period is modeled by the graph of $T$ shown below, where $T(x)$ is the temperature, in degrees Fahrenheit, x hours after midnight ($x = 0$).




a. At what time (approximately) does the high temperature of the day occur? What is the high temperature of the day?

b. Identify a time interval at which the temperature is increasing at a decreasing rate.

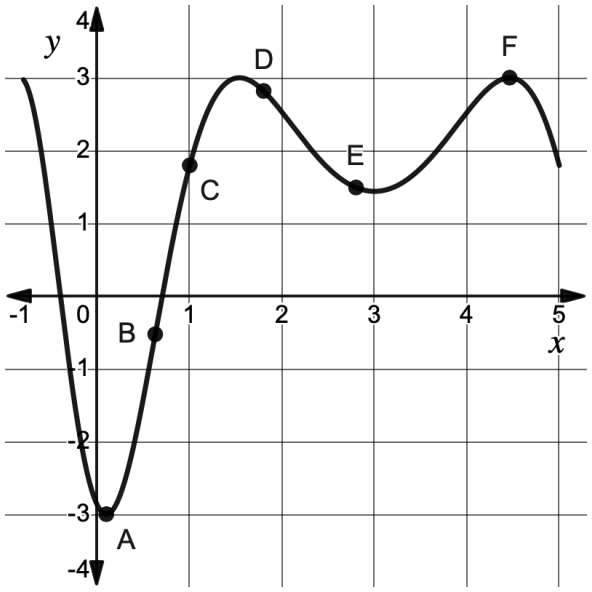
c. At approximately which times in the day is the temperature 40°?

D. Let $H(x)$ represent the number of homework problems assigned $x$ days into the school year in a Precalculus course.

a. Is 0 in the domain of $H$? Is 0 in the range of H? Explain.

b. Determine an appropriate domain and range for H.

E. The graph of a function $g$ is shown with 6 points labeled.

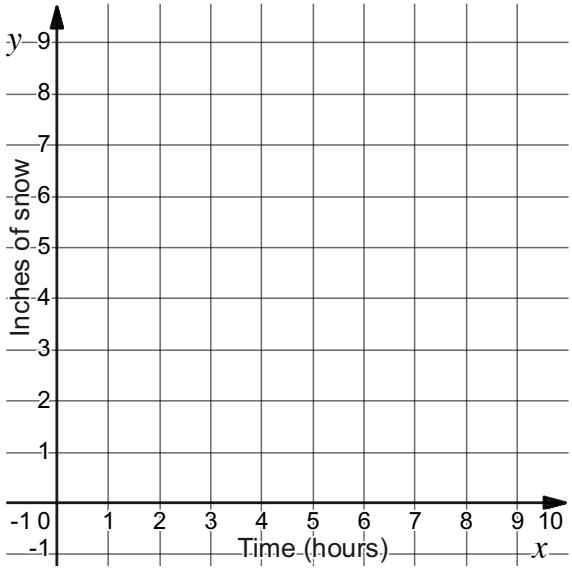



a. At which of the points is the rate of change of $g$ negative?

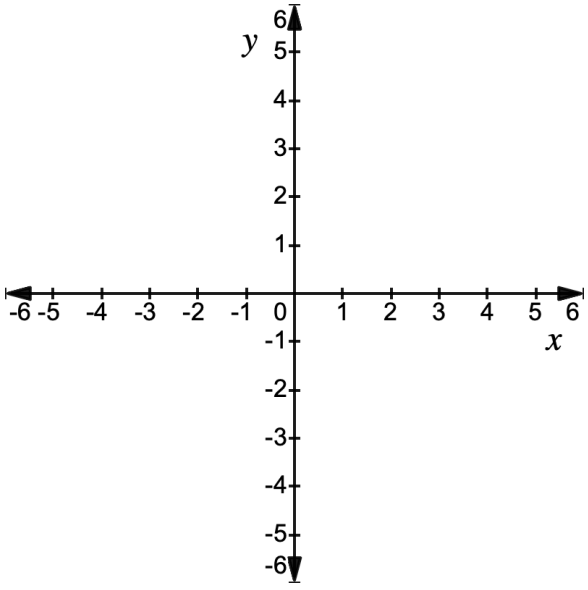
b. At which of the points does $g$ have the greatest rate of change?

c. At which of the points does $g$ have a rate of change of 0?

F. During a snowstorm, a meteorologist tracks the amount of accumulating snow. When the snowstorm starts there is already 1 inch of snow on the ground. For the first three hours of the storm, the snow fell at a constant rate of 2 inches per hour. The storm then stopped for two hours and then started again at a constant rate of one-half inch per hour for the next four hours. Sketch a graph of a function that could represent the number of inches of snow on the ground $x$ hours after the snowstorm begins.




G. Sketch a graph of a function $f$ that is decreasing on the interval $(-\infty, -3)$, increasing concave up on the interval $(-3,2)$ and increasing concave down on the interval $(2, \infty)$.



H. An ant crawls along the branch of a tree so that its horizontal position at time $t$ is given by $x(t) = t^2 - 6t + 5$, where $t$ is in seconds and $x(t)$ is measured in inches from the trunk of the tree.

a. How far from the trunk of the tree is the ant initially?

b. At which time(s) is the ant at the trunk of the tree?