

Homework 1.5

4. For each of the following functions,

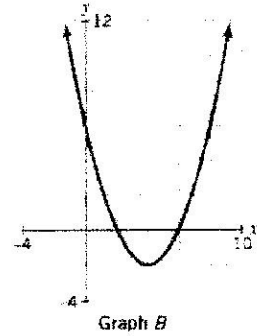
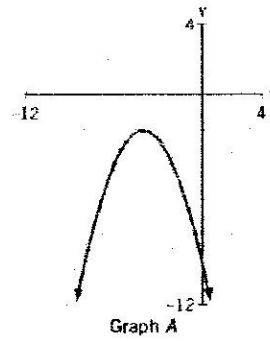
- Over which interval is the function decreasing?
- Over which interval is the function increasing?
- Does the function appear to have a minimum? If so, where?
- Does the function appear to have a maximum? If so, where?
- Describe the concavity.

Graph A

- $[-2, \infty)$
- $(-\infty, -2]$
- No.
- At $x = -2$
- Concave down on $(-\infty, \infty)$

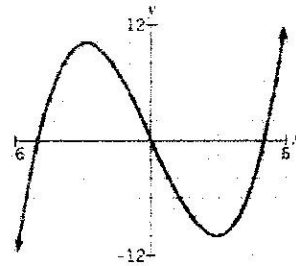
Graph B

- $(-\infty, 2]$
- $[2, \infty)$
- At $x = 2$
- No.
- Concave up on $(-\infty, \infty)$



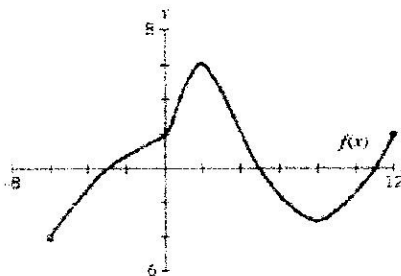
5. For the following function,

- Over which interval(s) is the function positive?
- Over which interval(s) is the function negative?
- Over which interval(s) is the function decreasing?
- Over which interval(s) is the function increasing?
- Does the function appear to have a minimum? If so, where?
- Does the function appear to have a maximum? If so, where?



- $[-5, 0] \cup [5, \infty)$
- $(-\infty, -5] \cup [0, 5]$
- $[-3, 3]$
- $(-\infty, -3] \cup [3, \infty)$
- No.
- No.

8. Look at the graph of $y = f(x)$ in the accompanying figure.



- Find $f(-6)$, $f(2)$, and $f(12)$.
 - Find $f(0)$.
 - For what values of x is $f(x) = 0$?
 - Is $f(8) > 0$ or is $f(8) < 0$?
 - How many times would the line $y = 1$ intersect the graph of $f(x)$?
 - What are the domain and range of $f(x)$?
 - What is the maximum? The minimum?
9. Use the graph of Exercise 8 to answer the following questions about $f(x)$.
- Over which interval(s) is $f(x) < 0$?
 - Over which interval(s) is $f(x) > 0$?
 - Over which interval(s) is $f(x)$ increasing?
 - Over which interval(s) is $f(x)$ decreasing?
 - How would you describe the concavity of $f(x)$ over the interval $(0, 5)$ for x ? Over $(5, 8)$ for x ?
 - Find a value for x when $f(x) = 4$.

8a. $f(-6) = -4$
 $f(2) = 6$
 $f(12) = 2$

b. $f(0) = 2$

c. $f(x) = 0$ for $x = -3, 5, 11$

d. $f(8) < 0$

e. 3

f. Domain: $[-6, 12]$
 Range: $[-4, 6]$

g. Max at $x = 2, y = 6$
 Min at $x = -6, y = -4$

9a. $[-6, -3] \cup [5, 11]$

b. $[-3, 5] \cup [11, 12]$

c. $[-3, 2] \cup [8, 12]$

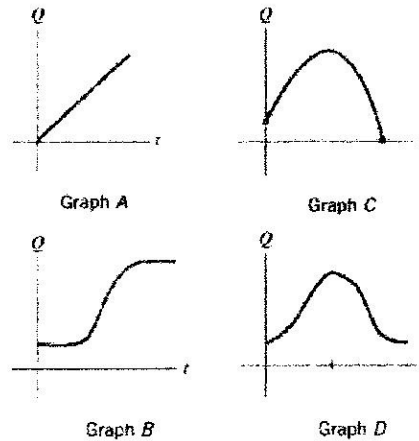
d. $[2, 8]$

e. Concave down on $(0, 5)$
 Concave up on $(5, 8)$

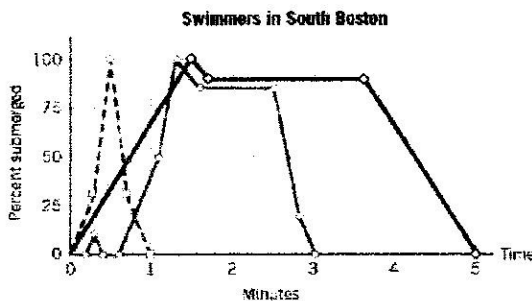
f. $f(x) = 4$ when $x = 1, 3$

10. Match each graph with the best description of the function. Assume that the horizontal axis represents time, t .

- C i. The height of a ball thrown straight up is a function of time.
 A ii. The distance a truck travels at a constant speed is a function of time.
 D iii. The number of daylight hours is a function of the day of the year.
 B iv. The temperature of a pie baking in an oven is a function of time.



26. The graph shows the progress of three different friends as they attempt to submerge themselves in a cold lake, with percentage of body submerged on the vertical axis and time on the horizontal axis. Match the graphs to the descriptions below of how each of the friends manages to get completely submerged.



Solid Black - Ali
 Solid Blue/Gray - Cat
 Dotted - Ben

- a. Ali has done this before and confidently walks in until his head is underwater, then he puts his head out and swims around a few minutes, then he walks out.
 b. Ben dashes in until the water is up to his knee, trips on a hidden rock, and falls in completely; he stands up and, since he is now totally wet, runs back out of the water.
 c. Cat puts one foot in, takes it out again, and shivers. She makes up her mind to get it over with, runs until she is up to her waist, dives in, swims back as close to the water's edge as she can get, stands up, and steps out of the water.