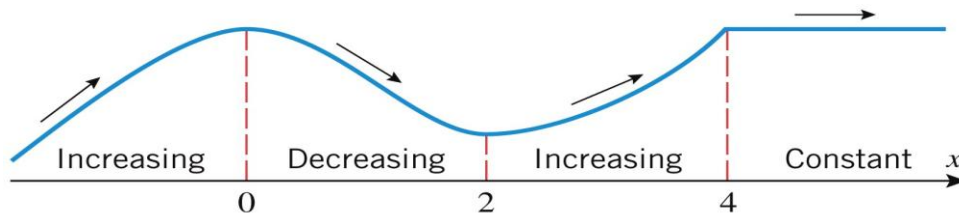


Increasing, Decreasing and Concavity

Warm-up

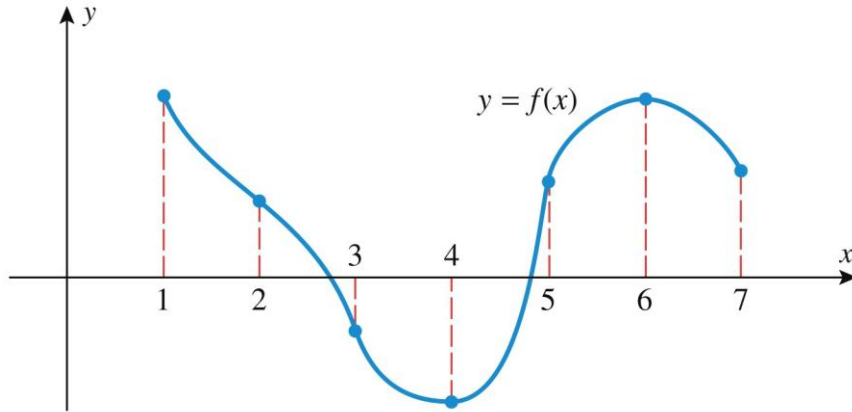
Look at the following figure.



1. Over what open intervals is the function increasing?
2. Over what open intervals is the function decreasing?
3. Over what open intervals is the function staying constant?
4. Define an increasing function.
5. Define a decreasing function.
6. Define a constant function.

Increasing, Decreasing and Concavity

Increasing and Decreasing Functions



Exercise Set 4.1 Figure Ex-7
© John Wiley & Sons, Inc. All rights reserved.

Write the open intervals where the function is:

a) Increasing _____

b) Decreasing _____

c) How is the slope of the tangent related to whether a function is increasing? _____

d) How is the slope of the tangent related to whether a function is decreasing? _____

Examples

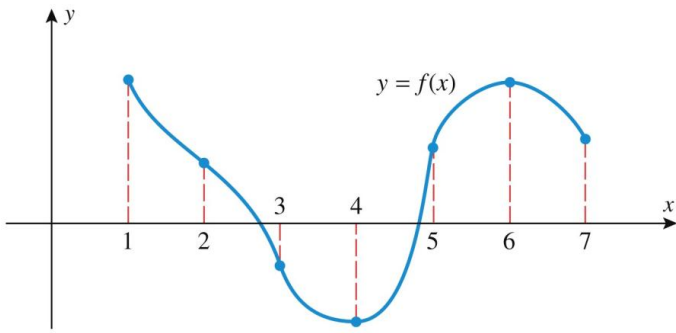
1. Find the open intervals on which $f(x) = x^2 - 4x + 3$ is increasing and decreasing.

Increasing, Decreasing and Concavity

2. Find the open intervals on which $f(x) = x^3$ is increasing and decreasing.

3. Find the open intervals on which $f(x) = 3x^4 + 4x^3 - 12x^2 + 2$ is increasing and decreasing.

Concave Up versus Concave Down



Exercise Set 4.1 Figure Ex-7
© John Wiley & Sons, Inc. All rights reserved.

a) On what open intervals is the function concave up? _____

b) On what open intervals is the function concave down? _____

How are the slope of the tangents related to whether a function is concave up or concave down? Investigate:

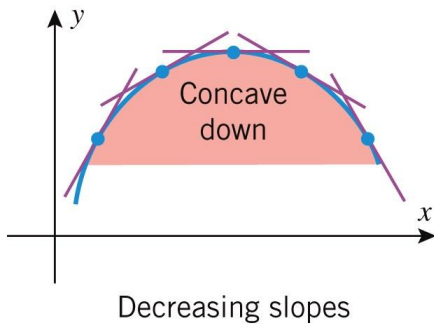
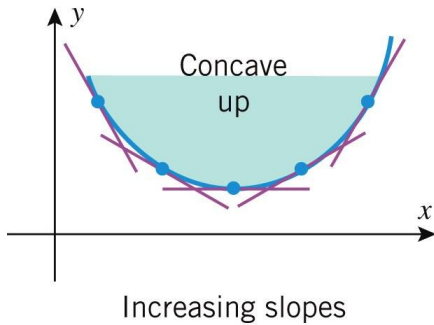


Figure 4.1.8
© John Wiley & Sons, Inc. All rights reserved.

Increasing, Decreasing and Concavity

Examples

4. On what open intervals is $f(x) = x^2 - 4x + 3$ concave up and concave down?

5. On what open intervals is $f(x) = x^3$ concave up and down?

Inflection Points

Inflection Points are _____.

Examples: Find the open intervals where each function is increasing, decreasing, concave up and concave down. Locate any inflection points.

6. $f(x) = x^3 - 3x^2 + 1$

7. $f(x) = x^4$

8. $f(x) = x = 2\sin x$ $[0, 2\pi]$

Summary

	$f'(x)$	$f''(x)$
Increasing		
Decreasing		
Concave Up		
Concave Down		
Inflection Point		