



Applications of Derivatives

1 Using the chart, is $x = -1$ a maximum, a minimum, or neither?

Interval	$f'(x)$	$f''(x)$
$(-\infty, -3)$	+	-
$(-3, -1)$	-	-
$(-1, 1)$	-	+
$(1, \infty)$	+	+

A

Neither

B

Minimum

C

Maximum

2 On which interval(s) is the function increasing?

Interval	$f'(x)$	$f''(x)$
$(-\infty, -1)$	-	+
$(-1, 0)$	+	+
$(0, 1)$	+	-
$(1, \infty)$	-	-

A

 $(-1, 0) \cup (0, 1)$

B

 $(-\infty, -1) \cup (-1, 0)$

C

 $(-\infty, -1) \cup (1, \infty)$

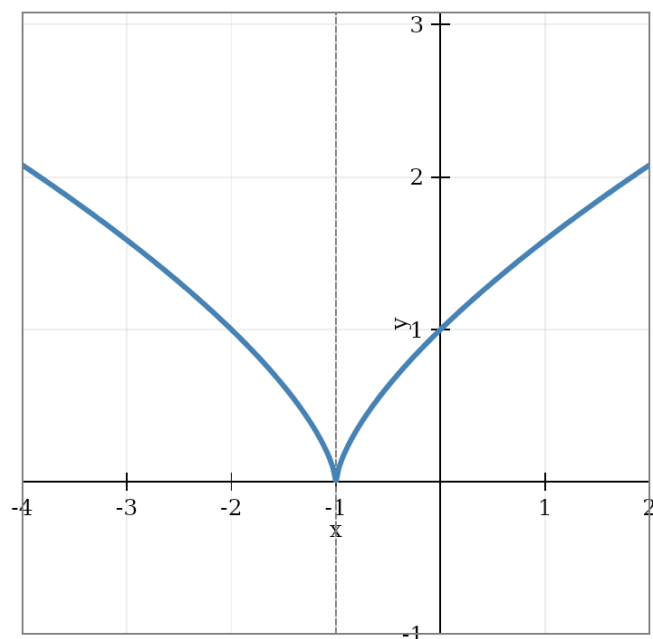
D

 $(0, 1) \cup (1, \infty)$



Applications of Derivatives

3 On which interval(s) is the first derivative positive?



A

 $(-1, \infty)$

B

 $(-\infty, -1)$

4 Which derivative chart matches this function?

$$f(x) = -2x^3 - 6x^2 + 18x + 2$$

A

Interval	$f'(x)$	$f''(x)$
$(-\infty, -1)$	-	+
$(-1, 1)$	+	+
$(1, 3)$	+	-
$(3, \infty)$	-	-

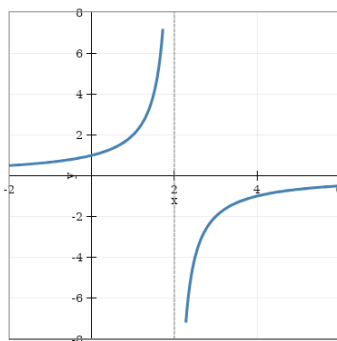
B

Interval	$f'(x)$	$f''(x)$
$(-\infty, -3)$	-	+
$(-3, -1)$	+	+
$(-1, 1)$	+	-
$(1, \infty)$	-	-



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5 Which derivative chart matches this graph?



A

Interval	$f'(x)$	$f''(x)$
$(-\infty, 2)$	-	+
$(2, \infty)$	-	-

B

Interval	$f'(x)$	$f''(x)$
$(-\infty, 2)$	+	+
$(2, \infty)$	+	-

6 Which derivative chart is correct for the interval $(0, 2)$?

$$f(x) = -2x^3 + 24x - 1$$

A

Interval	$f'(x)$	$f''(x)$
$(-\infty, -2)$	-	+
$(-2, 0)$	+	+
$(0, 2)$	-	+
$(2, \infty)$	-	-

B

Interval	$f'(x)$	$f''(x)$
$(-\infty, -2)$	-	+
$(-2, 0)$	+	+
$(0, 2)$	+	-
$(2, \infty)$	-	-



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7 Using the chart, is it true that $x = 0$ is a maximum?

Interval	$f'(x)$	$f''(x)$
$(-\infty, 0)$	+	-
$(0, 1)$	-	-
$(1, 2)$	-	+
$(2, \infty)$	+	+

A

Yes

B

No

8 What are the critical numbers (x-values) of the extrema (maxima or minima)?

$$f(x) = -2x^3 + 12x^2 + 3$$

A $x = 0, 2, 4$ B $x = 2$ C $x = 0, 4$ D $x = 0$

9 What are the critical numbers (x-values) of the function?

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

A $x = 0$ B $x = -1, 0, 1$ C $x = -1$ D $x = -1, 1$

10 Is $x = -2$ a valid critical number of this function on the interval?

A

No

B

Yes

11 On the interval $(0, \infty)$, what are the signs of $f'(x)$ and $f''(x)$?

$$f(x) = 2x^3 + 6x^2 + 4$$

A $f'(x)$ negative, $f''(x)$ positiveB $f'(x)$ positive, $f''(x)$ positiveC $f'(x)$ negative, $f''(x)$ negativeD $f'(x)$ positive, $f''(x)$ negative