

Determine intervals of increase and decrease

- 1 At $x = 0$, the function is decreasing.

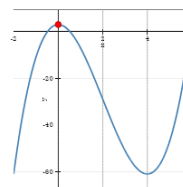
A $f''(x)$ is negative there

B $f'(x)$ is negative there

C $f'(x)$ is positive there

D $f''(x)$ is positive there

- 2 At the highlighted point, is $f'(x)$ positive, negative, or zero?



A Positive

B Can't be determined

C Negative

D Zero

- 3 Increasing on $(-4, -3)$ and $(-3, -2)$; decreasing on $(-\infty, -4)$ and $(-2, \infty)$.

A

Interval	$f'(x)$	$f''(x)$
$(-\infty, -4)$	+	+
$(-4, -3)$	-	+
$(-3, -2)$	-	-
$(-2, \infty)$	+	-

B

Interval	$f'(x)$	$f''(x)$
$(-\infty, -4)$	-	+
$(-4, -3)$	+	+
$(-3, -2)$	+	-
$(-2, \infty)$	-	-

- 4 Using the chart, is it true that $x = -2$ is a maximum?

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

A Yes

B No

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

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

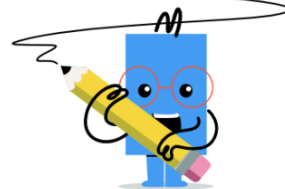
$$f'(x) = -6x^2 + 12x$$

A $x = 0$

B $x = 0, 1, 2$

C $x = 0, 2$

D $x = 1$



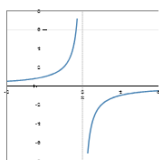
Determine intervals of increase and decrease

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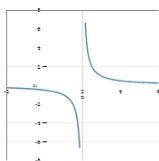
Which graph matches this derivative chart?

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

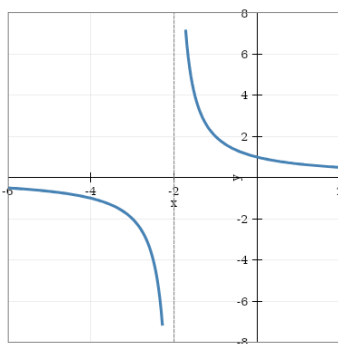
A



B

**7**

Which derivative chart matches this graph?

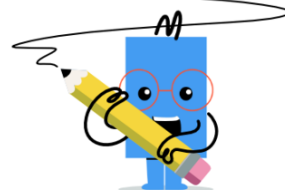


A

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

B

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



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On the interval $(-2, 0)$, is the slope positive or negative?

$$f(x) = 2x^3 + 12x^2 - 1$$

$$f'(x) = 6x^2 + 24x$$

A Positive

B Can't be determined

C Negative

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On the interval $(-\infty, -2)$, is $f'(x)$ positive, negative, or zero?

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

A Zero

B Negative

C Can't be determined

D Positive

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On which interval(s) is the function decreasing?

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

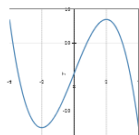
A $(-2, -1) \cup (-1, \infty)$ B $(-\infty, -3) \cup (-3, -2)$ C $(-\infty, -3) \cup (-1, \infty)$ D $(-3, -2) \cup (-2, -1)$ **11**

Given the derivative shown, where is the graph concave down?

$$f''(x) = 12x$$

A $x < -1$ or $x > 1$ B $x < 0$ C $x > 0$ D $-1 < x < 1$ **12**

On which interval(s) is the first derivative negative?

A $(-2, 0) \cup (0, 2)$ B $(-2, 0)$ C $(-\infty, -2)$ D $(-\infty, -2) \cup (2, \infty)$