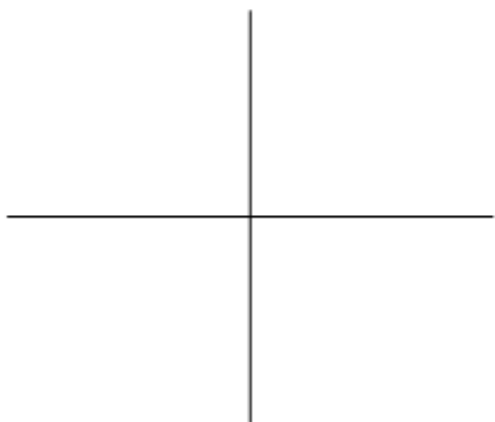


AP Calculus AB
2.11 - Sketching Graphs of f, f', f''

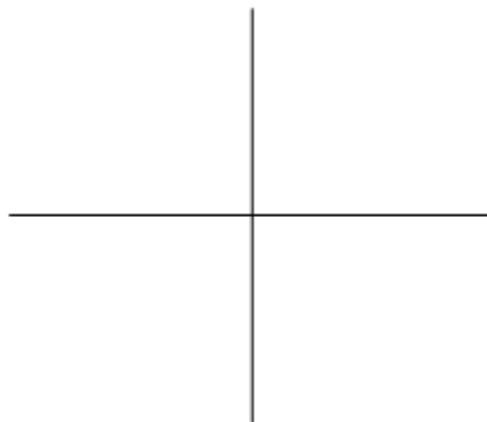
Activity 1

Enter the equations: $Y_1 = -4x^2$ and $Y_2 = nDeriv(Y_1, X, X)$ Window: X: [-1.5, 1.5] Y: [-10, 10]
 Set Y_2 to be a dotted line and make a sketch of each graph below.

$Y_1 = -4x^2$



$Y_2 = nDeriv(Y_1, X, X)$



Interval when graph of Y_1 is increasing: _____

Interval when graph of Y_2 is positive: _____

Interval when graph of Y_1 is decreasing: _____

Interval when graph of Y_2 is negative: _____

x -coordinate of maximum of Y_1 : _____

x -coordinate of zero of Y_2 : _____

At this x -coordinate, Y_2 changes sign from _____ to _____.

How is it possible to describe the behavior of Y_1 over $x = (a, b)$ by JUST looking at its derivative values over $x = (a, b)$?

When Y_1 is increasing over $x = (a, b)$, the value of the derivative over $x = (a, b)$ is...

When Y_1 is decreasing over $x = (a, b)$, the value of the derivative over $x = (a, b)$ is...

When Y_1 has a maximum value at $x = a$, the value of the derivative at $x = a$ is...

Activity 2

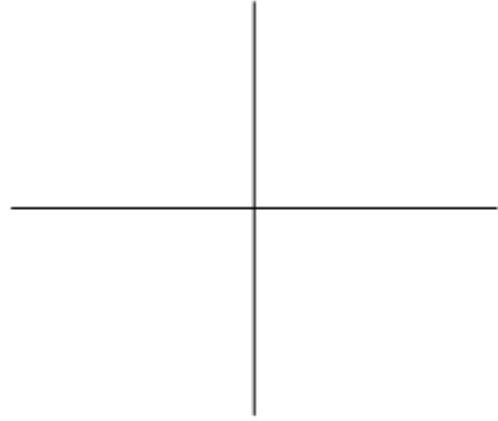
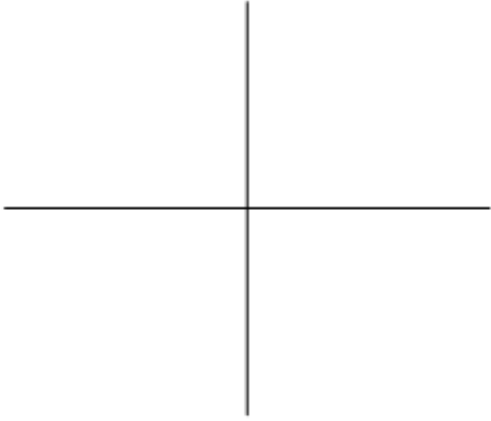
Enter the equations: $Y_1 = -4x^3 + x$, $Y_2 = nDeriv(Y_1, X, X)$, $Y_3 = nDeriv(Y_2, X, X)$

Window: X: [-1, 1] Y: [-2, 2]

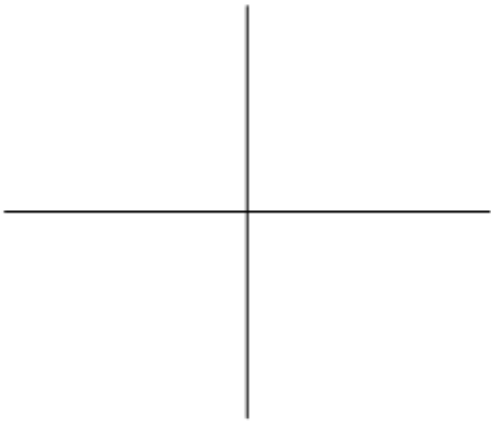
Set Y_2 to be a dotted line, Y_3 to be a bold line, and make a sketch of each graph below.

$Y_1 = -4x^2$

$Y_2 = nDeriv(Y_1, X, X)$



$Y_3 = nDeriv(Y_2, X, X)$



Interval when graph of Y_1 is increasing: _____

Interval when graph of Y_2 is positive: _____

Interval when graph of Y_1 is decreasing: _____

Interval when graph of Y_2 is negative: _____

x-coordinate of maximum of Y_1 : _____

x-coordinate of zero of Y_2 : _____

At this x-coordinate, Y_2 changes sign from _____ to _____.

x-coordinate of minimum of Y_1 : _____

x-coordinate of zero of Y_2 : _____

At this x-coordinate, Y_2 changes sign from _____ to _____.

Interval when graph of Y_1 is concave up: _____

Interval when graph of Y_3 is positive: _____

Interval when graph of Y_1 is concave down: _____

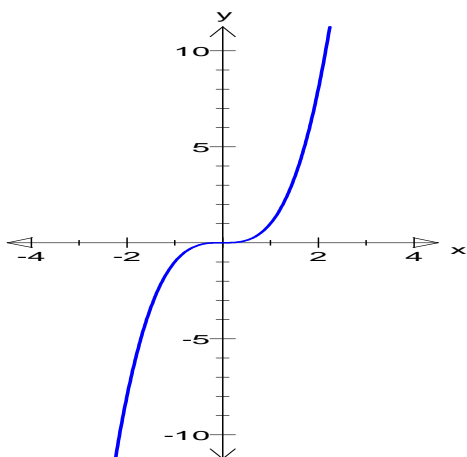
Interval when graph of Y_3 is negative: _____

What is the relationship between the concavity of the graph of $f(x)$ over $x = (a, b)$ and the values of $f''(x)$?

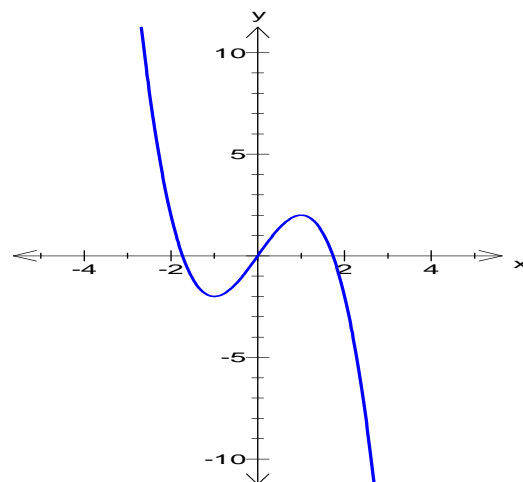
Further Practice

For each of the graphs of $f(x)$, sketch the corresponding graph of $f'(x)$.

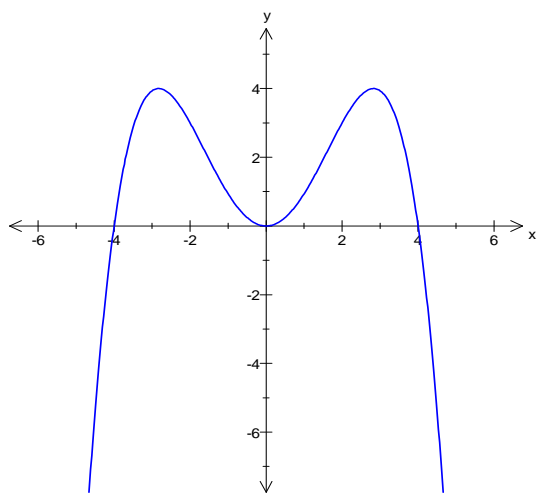
1.



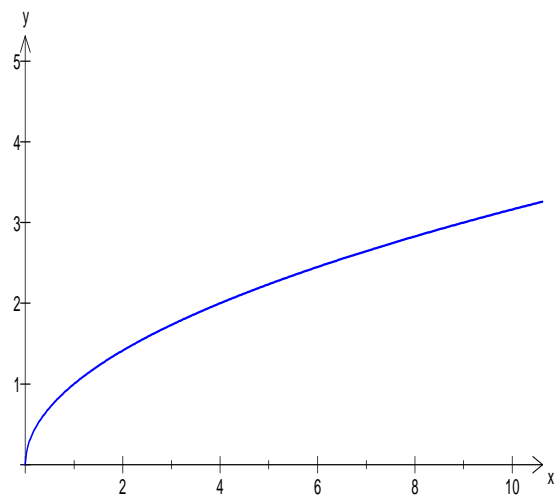
2.



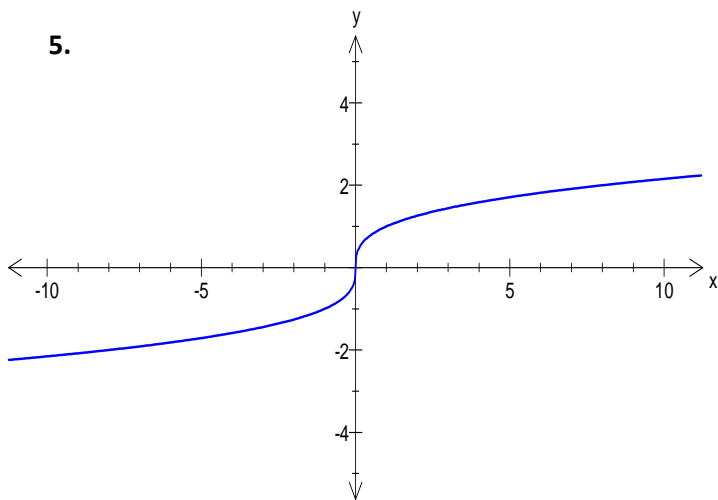
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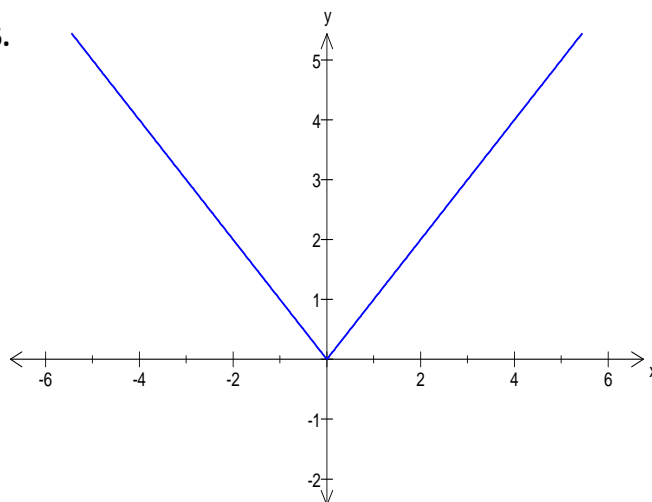
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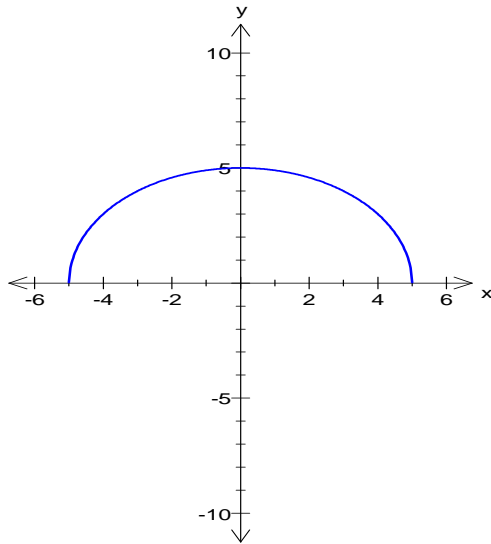
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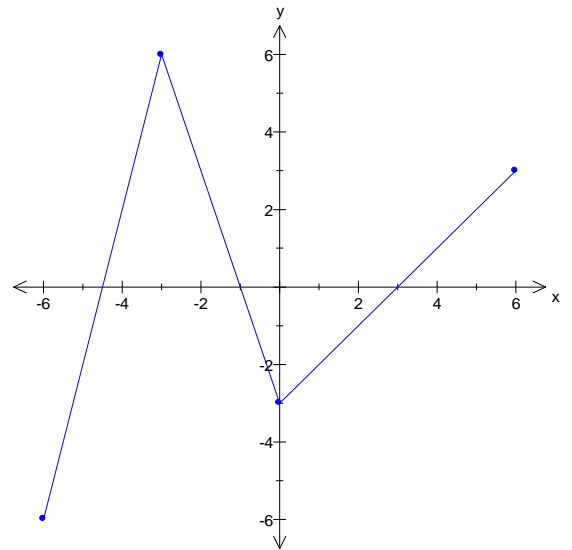
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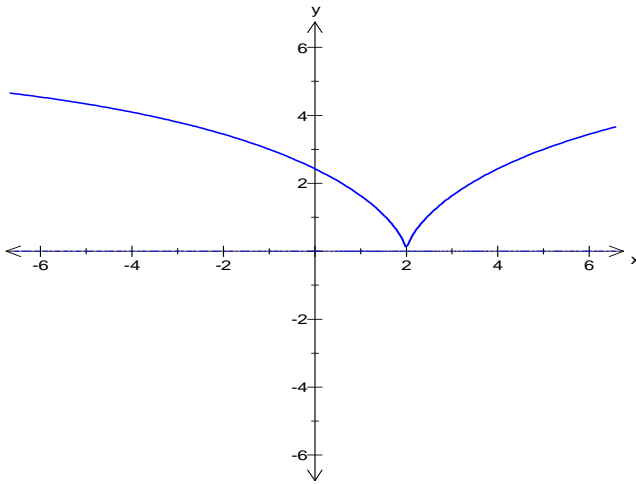
7.



8.



9.



10. Sketch the graphs of $f(x) = \frac{x^2 - 9}{x - 3}$ and $f'(x)$.

