

Unit Three Review

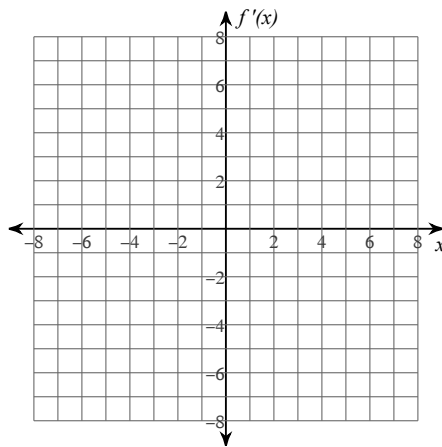
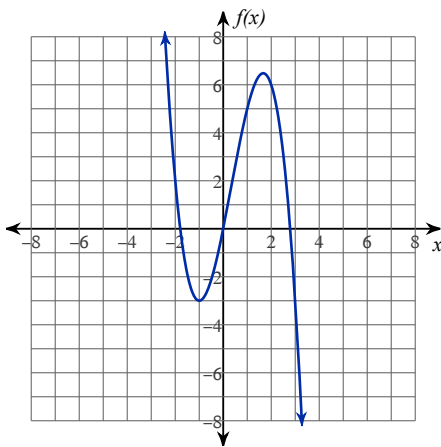
For each problem, find all points of absolute minima and maxima on the given interval.

1) $y = -x^4 + x^2 - 3$; $[-1, 1]$

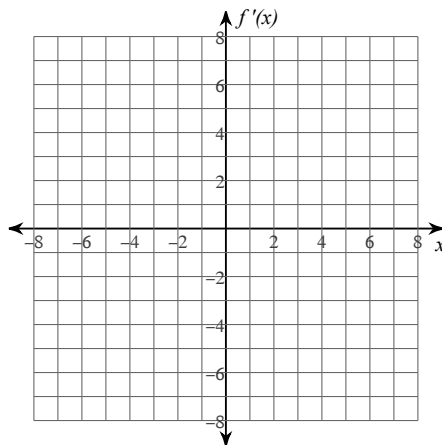
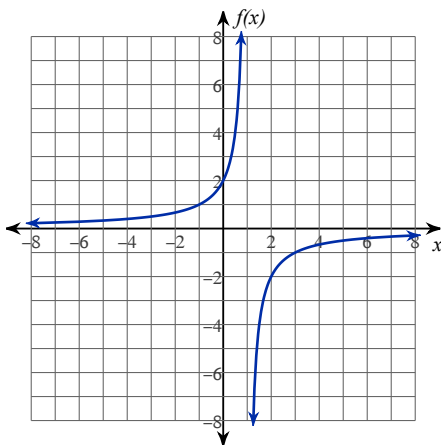
2) $y = -(5x - 15)^{\frac{1}{3}}$; $[1, 3]$

Given the graph of $f(x)$, sketch an approximate graph of $f'(x)$.

3)

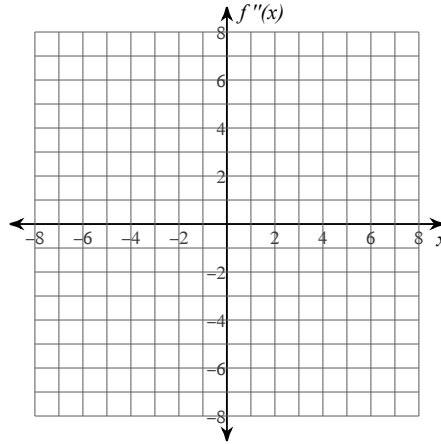
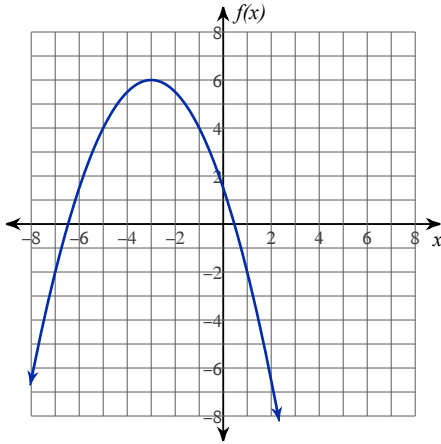


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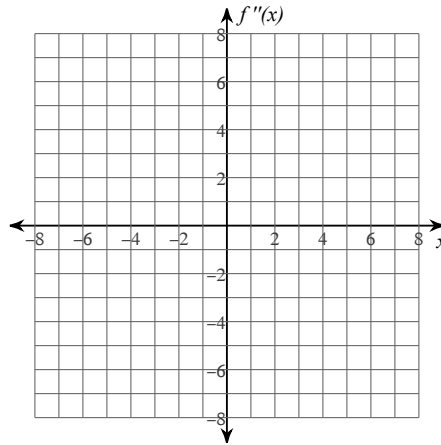
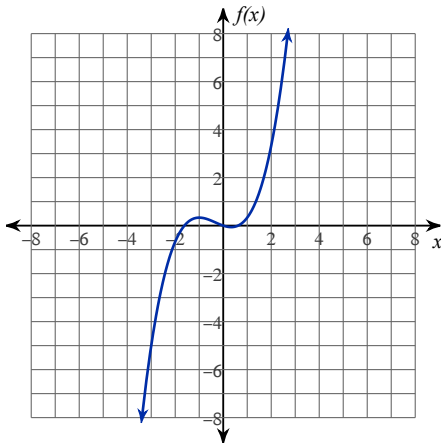


Given the graph of $f(x)$, sketch an approximate graph of $f''(x)$.

5)

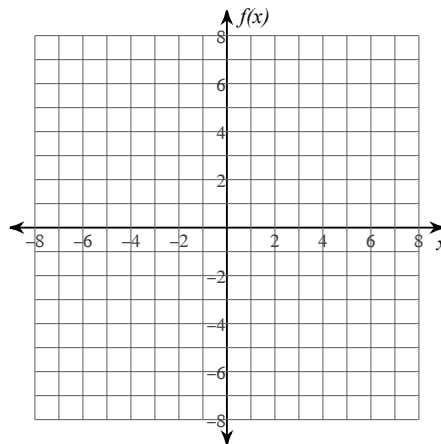
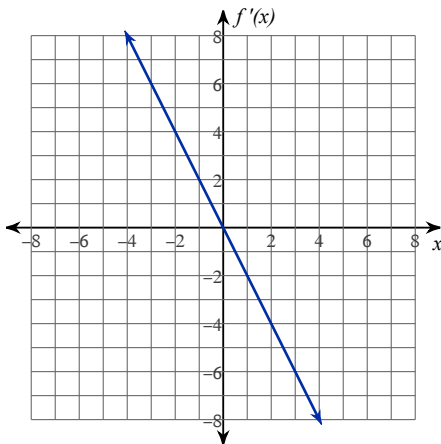


6)

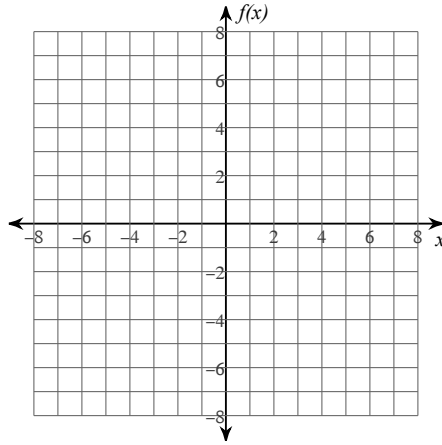
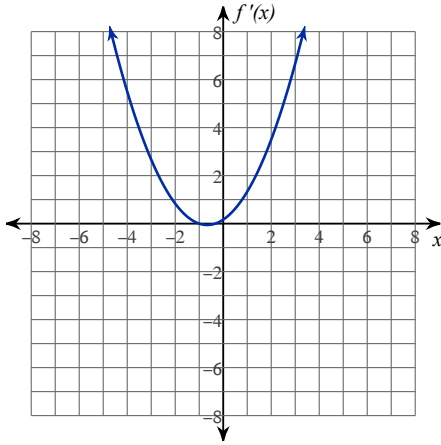


Given the graph of $f'(x)$, sketch a possible graph of $f(x)$.

7)



8)



For each problem, find the open intervals where the function is concave up and concave down.

9) $y = x^4 - 2x^2 - 3$

10) $y = \frac{3}{x^2 - 16}$

11) $y = -(3x + 18)^{\frac{2}{3}}$

12) $y = -\frac{1}{6}(x + 1)^{\frac{7}{3}} + \frac{14}{3}(x + 1)^{\frac{1}{3}} + 1$

13) $y = -\cot(x); [-\pi, \pi]$

For each problem, find the open intervals where the function is increasing and decreasing.

14) $y = -x^4 + x^2 - 1$

15) $y = -2\cot(x); [-\pi, \pi]$

16) $y = \frac{3}{x^2 - 16}$

17) $y = -(2x + 6)^{\frac{2}{3}}$

18) $y = \frac{1}{4}(x - 2)^{\frac{8}{3}} - 4(x - 2)^{\frac{2}{3}} + 2$

For each problem, determine if the Mean Value Theorem can be applied. If it can, find all values of c that satisfy the theorem. If it cannot, explain why not.

19) $y = -\frac{x^2}{2x - 4}; [3, 6]$

20) $y = \frac{-x^2 + 4}{2x}; [-1, 4]$

21) $y = -(2x + 2)^{\frac{2}{3}}; [-1, 4]$

22) $y = -(6x + 6)^{\frac{2}{3}}; [-2, 2]$

For each problem, find the differential dy .

23) $y = -\frac{2}{x}$

24) $y = \sqrt{x}$

25) $y = x^3 - 3$

26) $y = -x^2 + 4x - 2$

For each problem, find a linear approximation of the given quantity.

27) 8.98^4

28) $\sqrt{9.2}$

29) $\sqrt[3]{63.9}$

30) 8.01^3