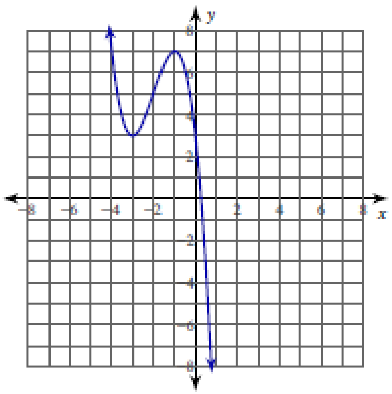
More Review on 3.1-3.3 Key

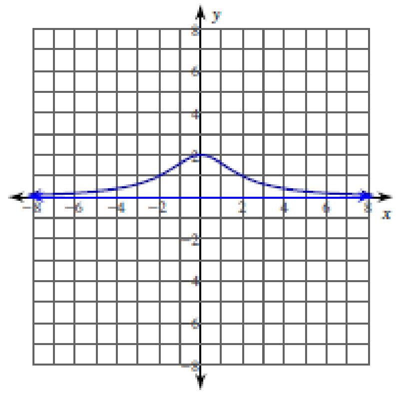
For each problem, find all points of absolute minima and maxima on the given closed interval.

1) $y = -x^3 - 6x^2 - 9x + 3;\quad [-3, -1]$



Absolute minimum: $(-3, 3)$
Absolute maximum: $(-1, 7)$

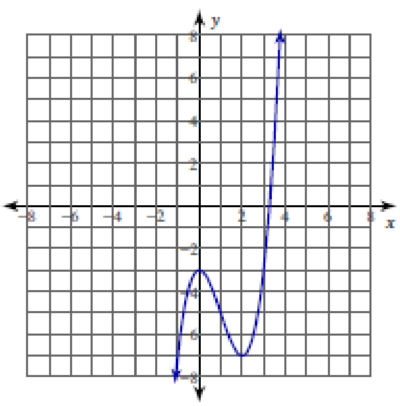
2) $y = \dfrac{8}{x^2 + 4};\quad [0, 5]$



Absolute minimum: $\left(5, \dfrac{8}{29}\right)$
Absolute maximum: $(0, 2)$

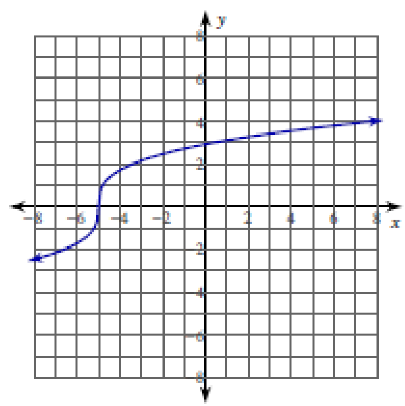
For each problem, find all points of absolute minima and maxima on the given interval.

7) $y = x^3 - 3x^2 - 3;\quad (0, 3)$



Absolute minimum: $(2, -7)$
No absolute maxima.

8) $y = (5x + 25)^{\frac{1}{3}};\quad [-2, 2]$



Absolute minimum: $\left(-2, \sqrt[3]{15}\right)$
Absolute maximum: $\left(2, \sqrt[3]{35}\right)$

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

13) $y = \dfrac{x^2 - x - 12}{x + 4};\quad [-3, 4]$

$\{-4 + 2\sqrt{2}\}$

14) $y = \dfrac{-x^2 - 2x + 8}{-x + 3};\quad [-4, 2]$

$\{3 - \sqrt{7}\}$

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.

11) $y = -\frac{x^2}{4x + 8}$; $[-3, -1]$

The function is not continuous on $[-3, -1]$

12) $y = \frac{-x^2 + 9}{4x}$; $[1, 3]$

$\{\sqrt{3}\}$

For each problem, find all points of relative minima and maxima.

3) $y = -x^3 - 3x^2 - 1$

Relative minimum: $(-2, -5)$
Relative maximum: $(0, -1)$

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

Relative minima: $(-1, 2)$, $(1, 2)$
Relative maximum: $(0, 3)$

5) $y = x^4 - x^2$

Relative minima: $\left(-\frac{\sqrt{2}}{2}, -\frac{1}{4}\right)$, $\left(\frac{\sqrt{2}}{2}, -\frac{1}{4}\right)$

Relative maximum: $(0, 0)$

6) $y = -\frac{2}{x^2 - 4}$

Relative minimum: $\left(0, \frac{1}{2}\right)$

No relative maxima.