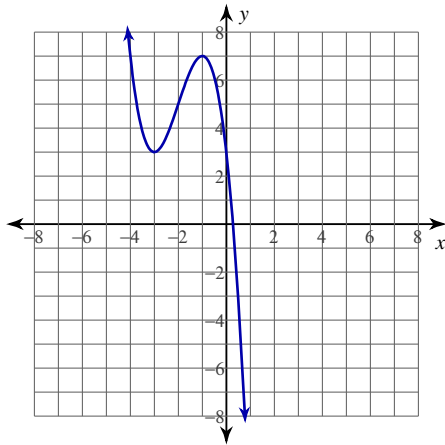


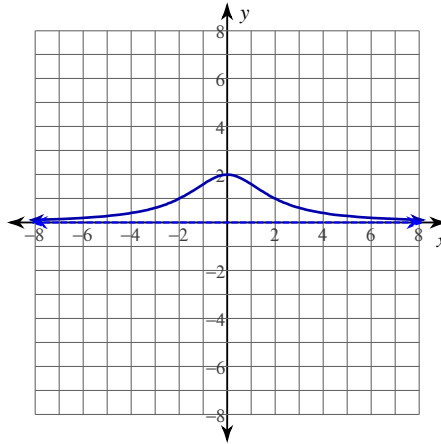
Absolute Extrema

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

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



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



3) $y = x^3 + 6x^2 + 9x + 3$; $[-4, 0]$

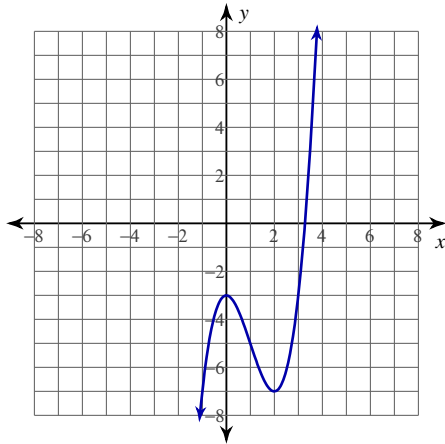
4) $y = x^4 - 3x^2 + 4$; $[-1, 1]$

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

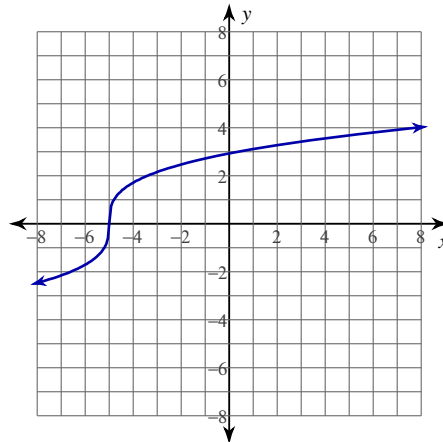
6) $y = (x + 2)^{\frac{2}{3}}$; $[-4, -2]$

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

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



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



9) $y = x^3 - 3x^2 + 6$; $[0, \infty)$

10) $y = x^4 - 2x^2 - 3$; $(0, \infty)$

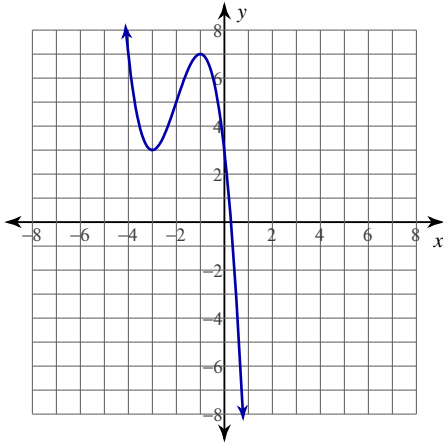
11) $y = \frac{4}{x^2 + 2}$; $(-5, -2]$

12) $y = -\frac{1}{6}(x+1)^{\frac{7}{3}} + \frac{14}{3}(x+1)^{\frac{1}{3}}$; $(-5, 0)$

Absolute Extrema

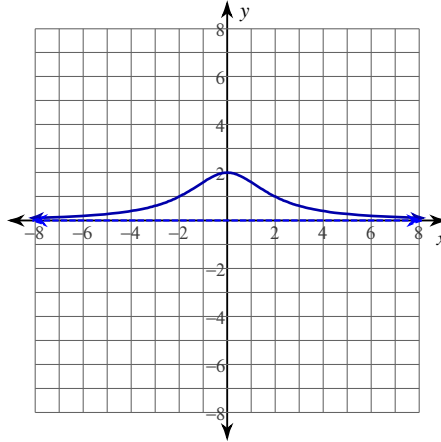
For each problem, find all points of absolute minima and maxima on the given closed interval.

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



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

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



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

3) $y = x^3 + 6x^2 + 9x + 3$; $[-4, 0]$

Absolute minima: $(-4, -1), (-1, -1)$
 Absolute maxima: $(0, 3), (-3, 3)$

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

Absolute minima: $(-1, 2), (1, 2)$
 Absolute maximum: $(0, 4)$

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

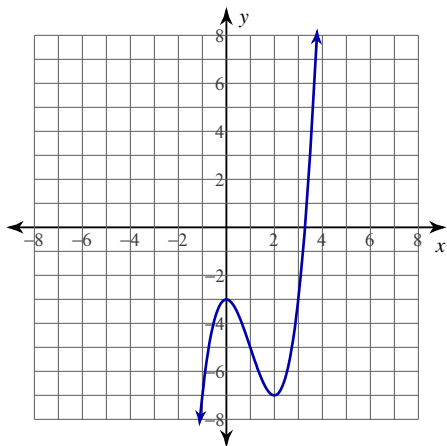
Absolute minimum: $(4, \frac{8}{3})$
 Absolute maxima: $(3, 3), (6, 3)$

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

Absolute minimum: $(-2, 0)$
 Absolute maximum: $(-4, \sqrt[3]{4})$

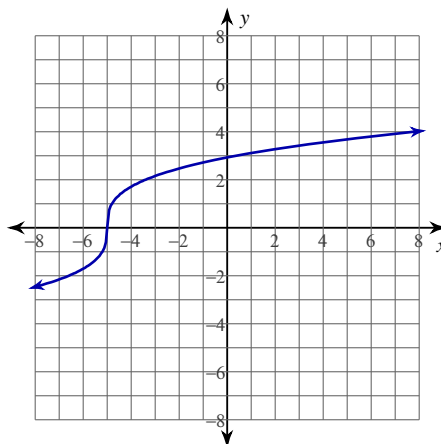
For each problem, find all points of absolute minima and maxima on the given interval.

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



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

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



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

9) $y = x^3 - 3x^2 + 6$; $[0, \infty)$

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

10) $y = x^4 - 2x^2 - 3$; $(0, \infty)$

Absolute minimum: $(1, -4)$
No absolute maxima.

11) $y = \frac{4}{x^2 + 2}$; $(-5, -2]$

No absolute minima.
Absolute maximum: $(-2, \frac{2}{3})$

12) $y = -\frac{1}{6}(x + 1)^{\frac{7}{3}} + \frac{14}{3}(x + 1)^{\frac{1}{3}}$; $(-5, 0)$

Absolute minimum: $(-3, -4\sqrt[3]{2})$
No absolute maxima.