Name_____

Absolute Extrema

Date_____ Period____

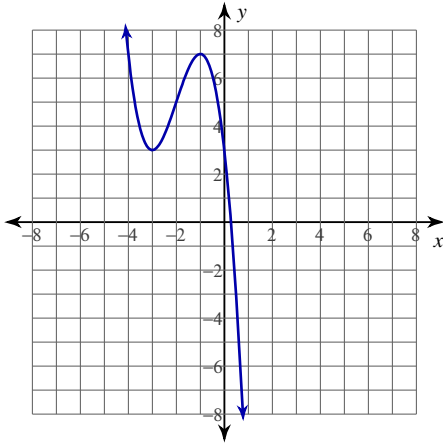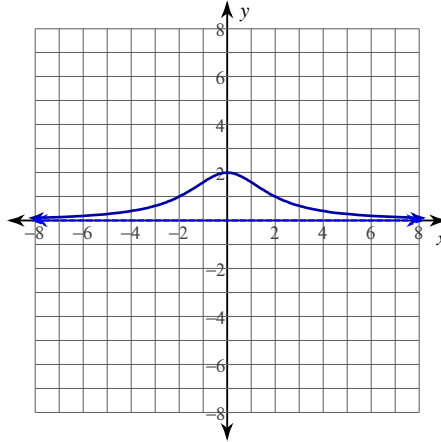**For each problem, find all points of absolute minima and maxima on the given closed interval.**

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

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

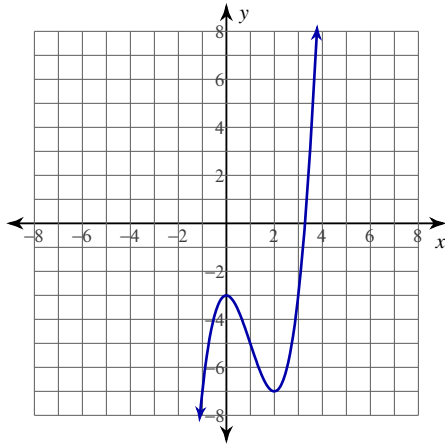3) $y = x^3 + 6x^2 + 9x + 3$; $[-4, 0]$

4) $y = x^4 - 3x^2 + 4$; $[-1, 1]$
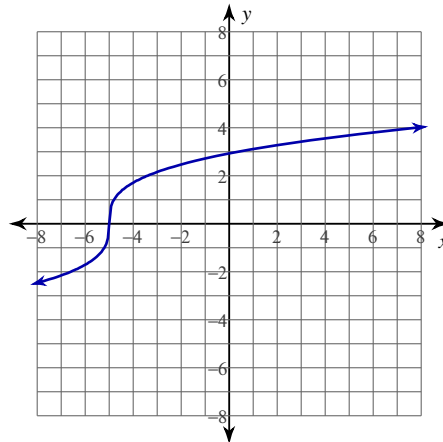
5) $y = \dfrac{x^2}{3x - 6}$; $[3, 6]$

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) $y = x^4 - 2x^2 - 3$; $(0, \infty)$
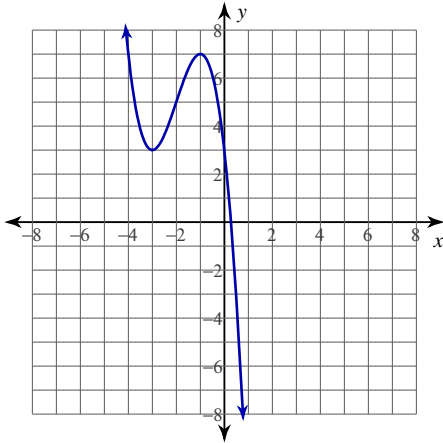
11) $y = \dfrac{4}{x^2 + 2}$; $(-5, -2]$

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

Name_____

Absolute Extrema
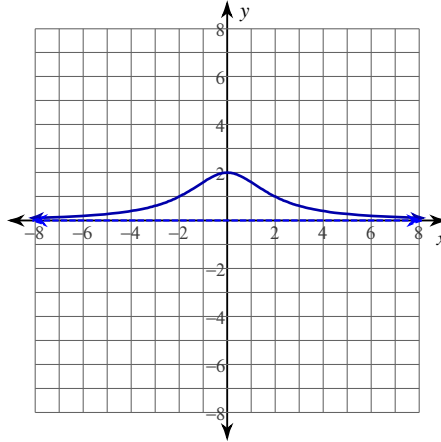
Date_____ Period____

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

Absolute minimum: $\left(5, \dfrac{8}{29}\right)$
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: $(0, 4)$

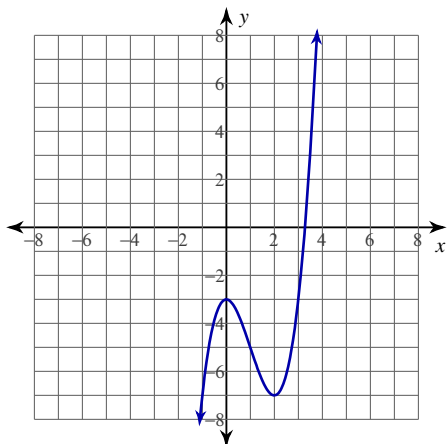5) $y = \dfrac{x^2}{3x - 6};$ $[3, 6]$

Absolute minimum: $\left(4, \dfrac{8}{3}\right)$
Absolute maxima: $(3, 3), (6, 3)$

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

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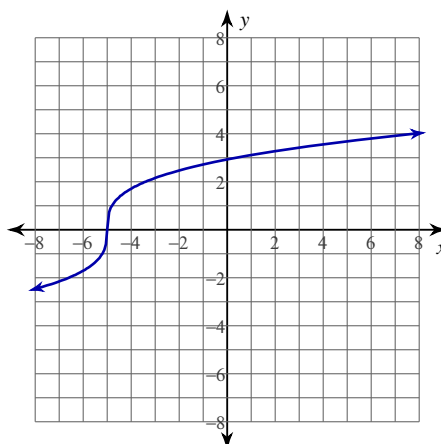Absolute maximum: $\left(-4, \sqrt[3]{4}\right)$

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

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

No absolute minima.

Absolute maximum: $\left(-2, \dfrac{2}{3}\right)$

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

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