Calculus

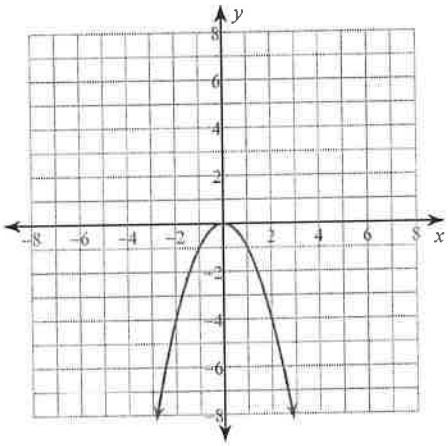
Name_____ ID: 1

Extrema

Date_____ Period____

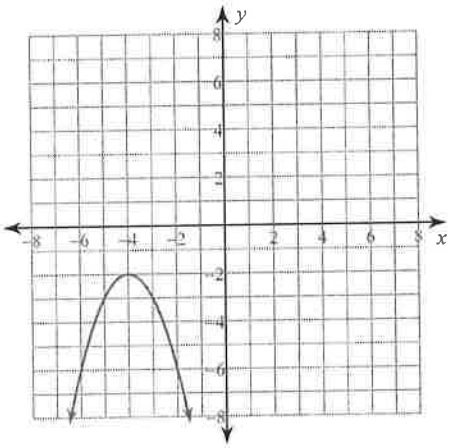
For each problem, find all points of relative minima and maxima. Use the provided graph to Draw the function.

1) $y = -x^2$



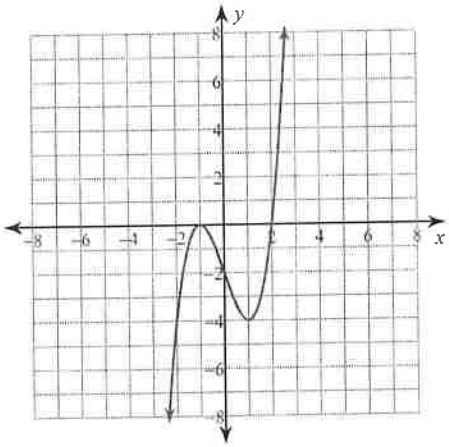
No relative minima.
Relative maximum: $(0, 0)$

2) $y = -x^2 - 8x - 18$



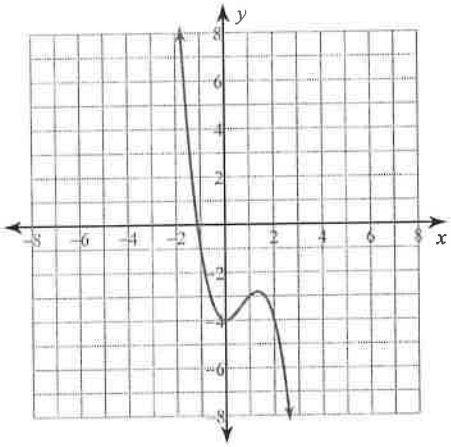
No relative minima.
Relative maximum: $(-4, -2)$

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



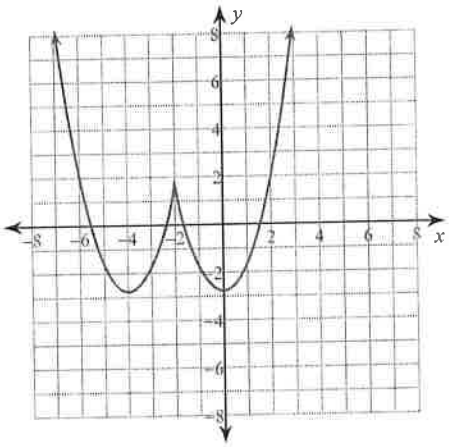
Relative minimum: $(1, -4)$
Relative maximum: $(-1, 0)$

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



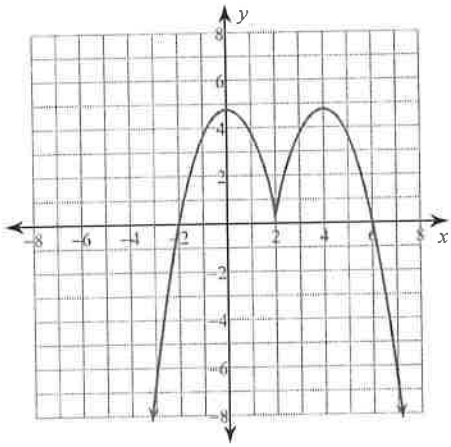
Relative minimum: $(0, -4)$
Relative maximum: $\left(\frac{4}{3}, -\frac{76}{27}\right)$

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



Relative minima: $(-4, -3\sqrt[3]{4} + 2)$, $(0, -3\sqrt[3]{4} + 2)$
Relative maximum: $(-2, 2)$

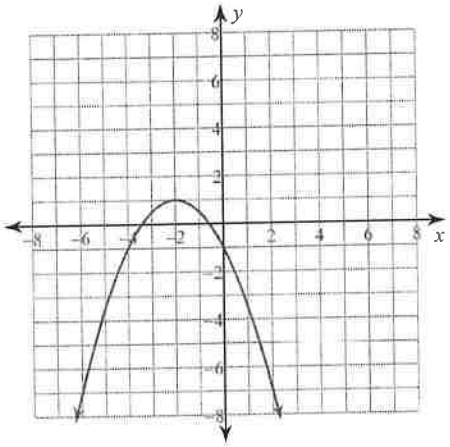
6) $y = -\frac{1}{4}(x-2)^{\frac{8}{3}} + 4(x-2)^{\frac{2}{3}}$



Relative minimum: $(2, 0)$
Relative maxima: $(0, 3\sqrt[3]{4})$, $(4, 3\sqrt[3]{4})$

For each problem, find all points of absolute minima and maxima on the given interval. Use the provided graph to Draw the function.

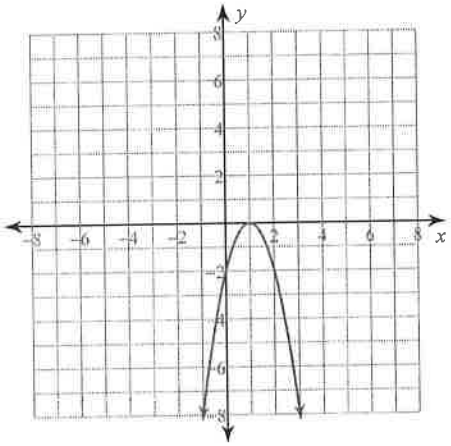
7) $y = -\frac{x^2}{2} - 2x - 1; \quad [-5, -3]$



Absolute minimum: $\left(-5, -\frac{7}{2}\right)$

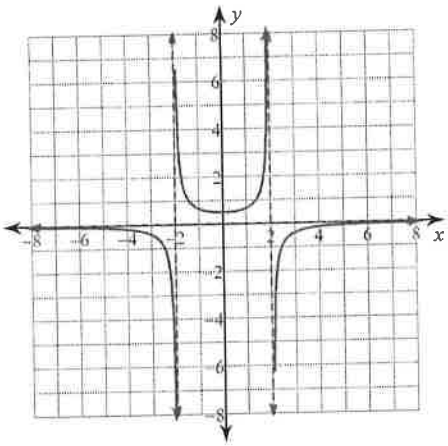
Absolute maximum: $\left(-3, \frac{1}{2}\right)$

8) $y = -2x^2 + 4x - 2; \quad [0, 2]$



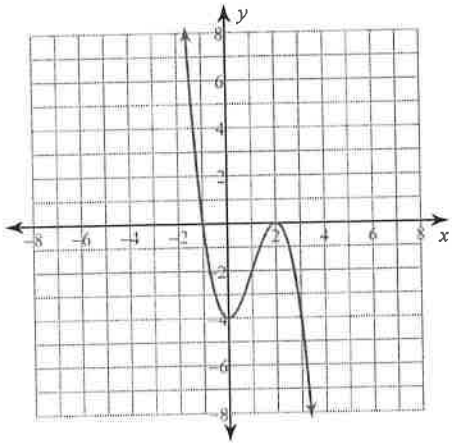
Absolute minima: $(0, -2)$, $(2, -2)$
Absolute maximum: $(1, 0)$

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



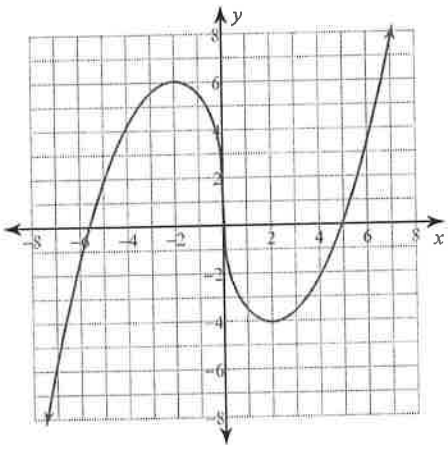
No absolute minima.
No absolute maxima.

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



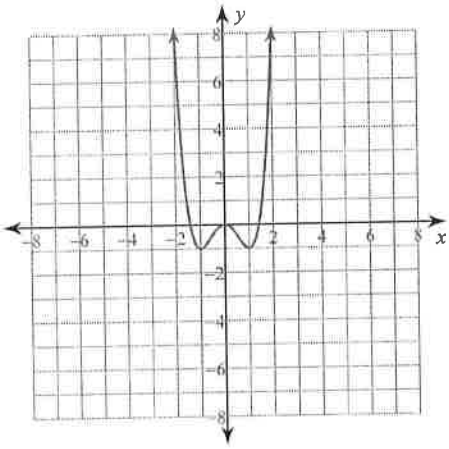
Absolute minimum: $(0, -4)$
Absolute maximum: $(2, 0)$

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



Absolute minimum: $\left(2, -4\sqrt[3]{2} + 1\right)$
No absolute maxima.

12) $y = x^4 - 2x^2$; $(-\infty, \infty)$



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