Set 3
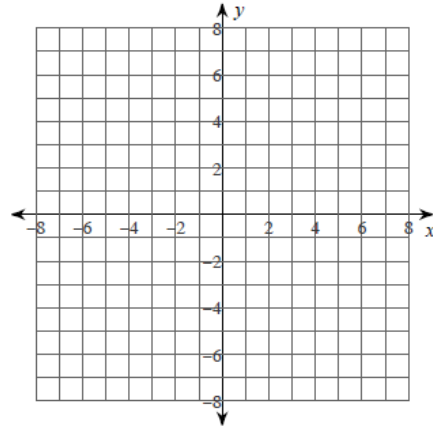
Curve Sketching and Abs Extrema

For each problem, find all points of absolute minima and maxima on the given interval. You may use the provided graph to sketch the function.

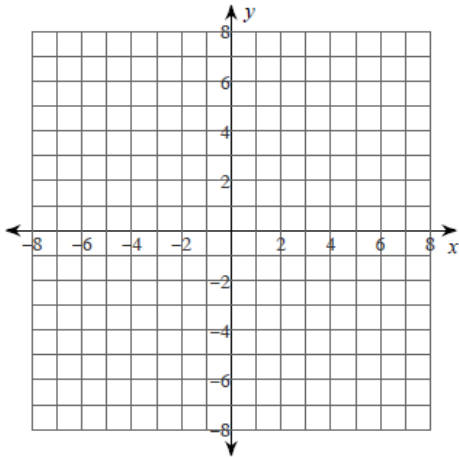1) $y = -\dfrac{4x}{x^2 + 4}$; $[-5, 0]$
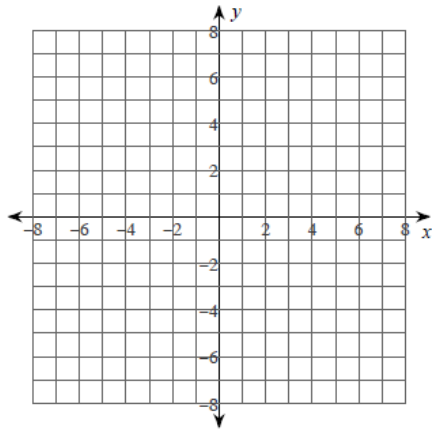
2) $y = 2x^2 - 1$; $[-2, 1]$

Set 3

Answers

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

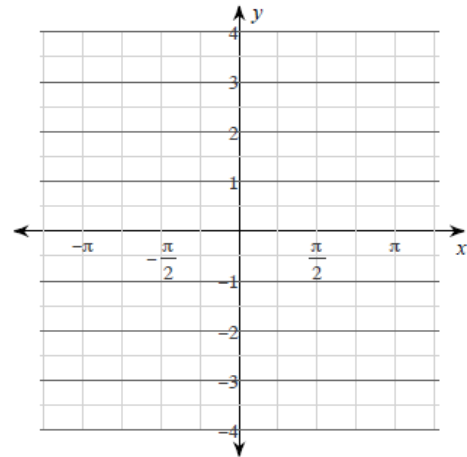2) Absolute minimum: $(0, -1)$
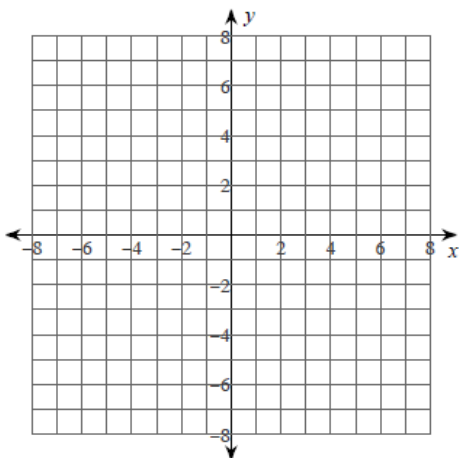   Absolute maximum: $(-2, 7)$

Set 3

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

4) $y = \sin(x)$; $\left[-\dfrac{3\pi}{4}, 0\right]$

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

6) $y = x^2 - 6x + 9$; $[3, 5]$
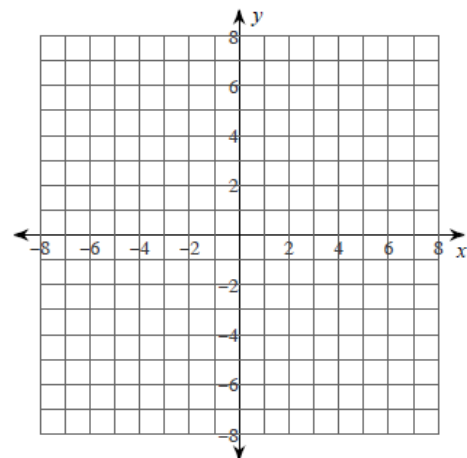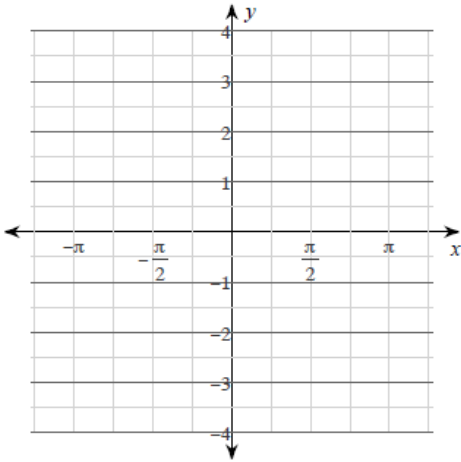
Set 3

Answers

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

Absolute maxima: $(-6, 3), (-3, 3)$

5) Absolute minima: $(0, 0), (3, 0)$

Absolute maximum: $(2, 4)$

4) Absolute minimum: $\left(-\dfrac{\pi}{2}, -1\right)$

Absolute maximum: $(0, 0)$
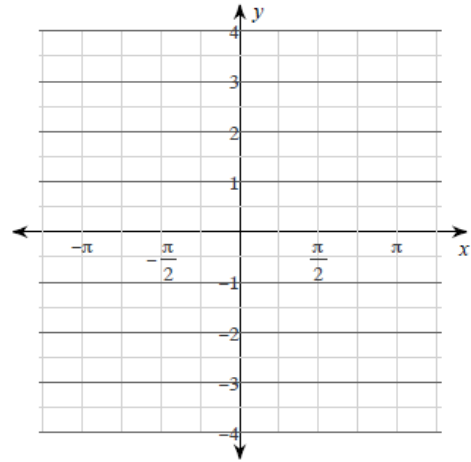
6) Absolute minimum: $(3, 0)$

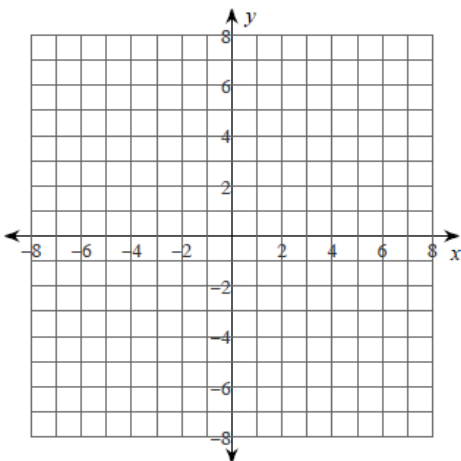Absolute maximum: $(5, 4)$

Set 3

7) $y = \cot(x);\quad [\frac{\pi}{4}, \frac{\pi}{3}]$

8) $y = \cot(x);\quad [-\frac{\pi}{2}, -\frac{\pi}{3}]$

9) $y = x^4 - 2x^2 + 2;\quad [-1, 1]$

Set 3

Answers

7) Absolute minimum: $\left(\dfrac{\pi}{3}, \dfrac{\sqrt{3}}{3}\right)$

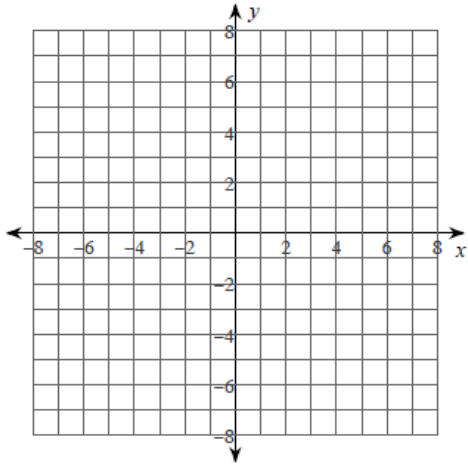   Absolute maximum: $\left(\dfrac{\pi}{4}, 1\right)$

8) Absolute minimum: $\left(-\dfrac{\pi}{3}, -\dfrac{\sqrt{3}}{3}\right)$

   Absolute maximum: $\left(-\dfrac{\pi}{2}, 0\right)$

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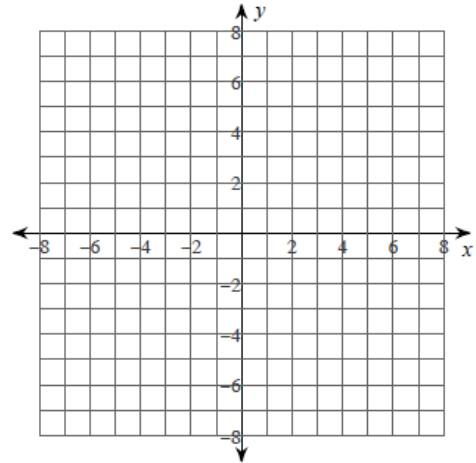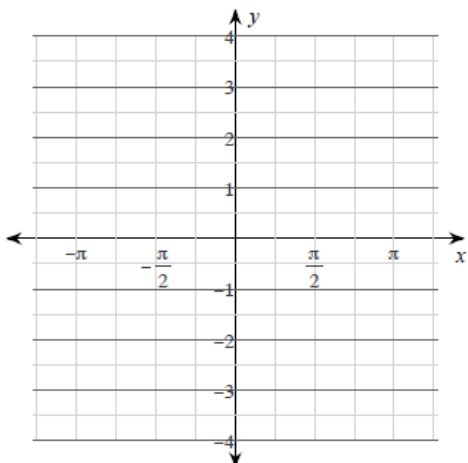   Absolute maximum: $(0, 2)$

Set 3

10) $y = -\dfrac{x^2}{2} + 1;\quad [-3, 3]$

11) $y = x^3 - 3x^2;\quad [0, 3]$

12) $y = \tan(2x);\quad [-\dfrac{\pi}{2}, \dfrac{\pi}{2}]$

Answers

10) Absolute minima: $\left(-3, -\dfrac{7}{2}\right), \left(3, -\dfrac{7}{2}\right)$

11) Absolute minimum: $(2, -4)$
    Absolute maxima: $(0, 0), (3, 0)$

    Absolute maximum: $(0, 1)$
12) No absolute minima.
    No absolute maxima.