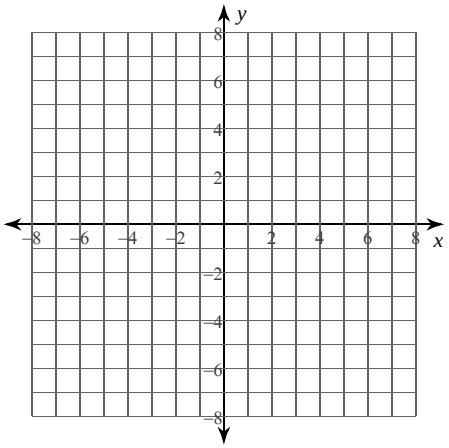
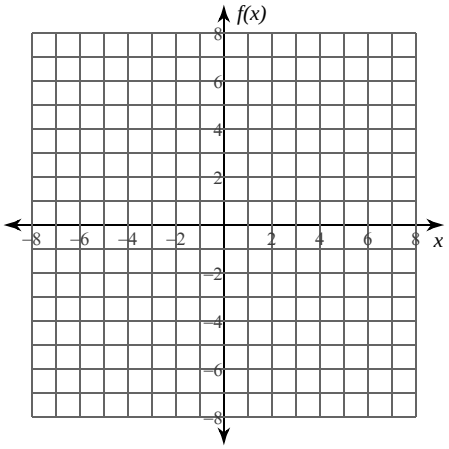
# Calculus Practice: Curve Sketching 5

**For each problem, find the: x and y intercepts, asymptotes, x-coordinates of the critical points, open intervals where the function is increasing and decreasing, x-coordinates of the inflection points, open intervals where the function is concave up and concave down, and relative minima and maxima. Using this information, sketch the graph of the function.**

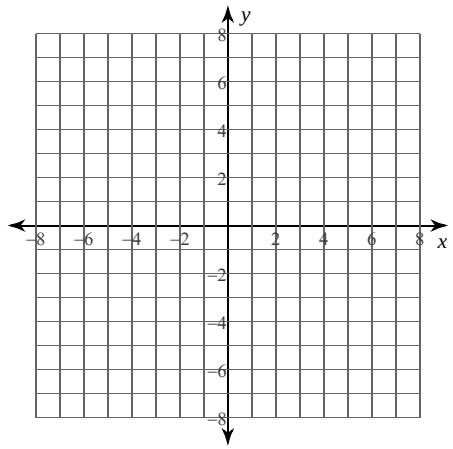
1) $y = -(3x + 12)^{\frac{2}{3}}$



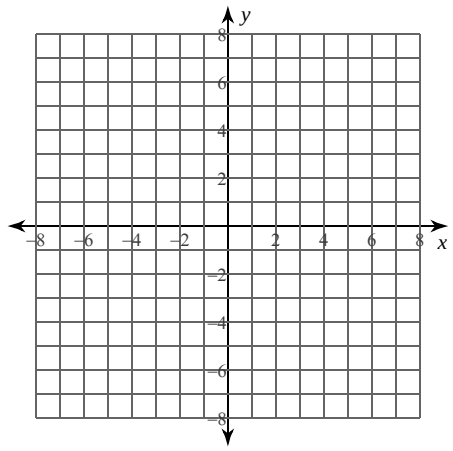

2) $f(x) = -(2x + 12)^{\frac{1}{3}}$



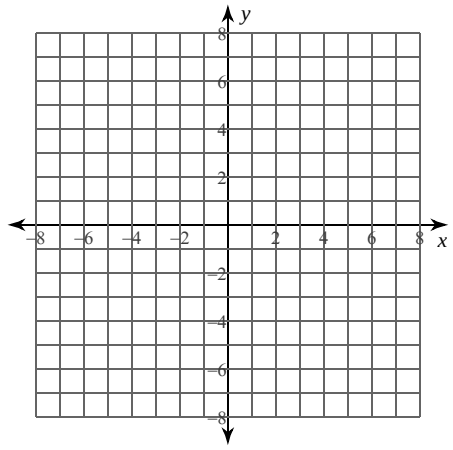
3) $y = \frac{1}{5}(x+4)^{\frac{5}{3}} - 2(x+4)^{\frac{2}{3}}$




4) $y = -\frac{1}{6}(x-2)^{\frac{7}{3}} + \frac{14}{3}(x-2)^{\frac{1}{3}}$



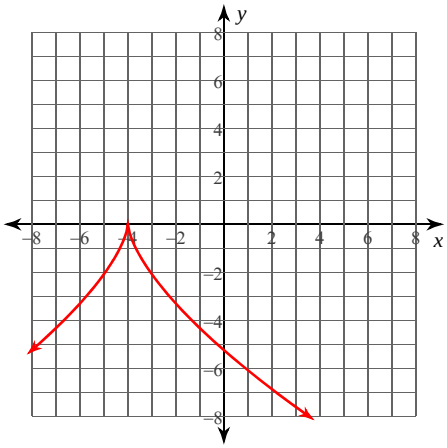

5) $y = -\frac{1}{4}x^{\frac{8}{3}} + 4x^{\frac{2}{3}}$



# Calculus Practice: Curve Sketching 5

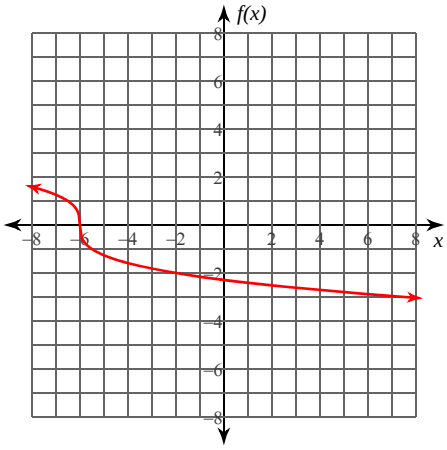
**For each problem, find the: x and y intercepts, asymptotes, x-coordinates of the critical points, open intervals where the function is increasing and decreasing, x-coordinates of the inflection points, open intervals where the function is concave up and concave down, and relative minima and maxima. Using this information, sketch the graph of the function.**

1) $y = -(3x + 12)^{\frac{2}{3}}$



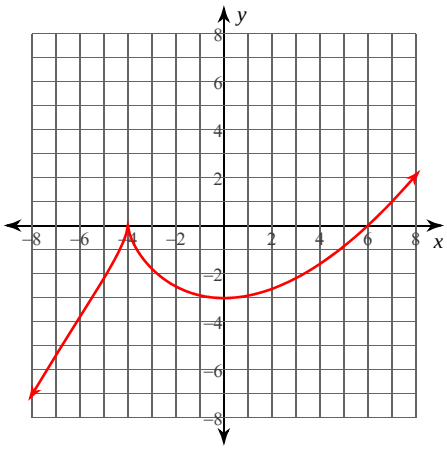

$x$-intercept at $x = -4$ $y$-intercept at $y = -2\sqrt[3]{18}$
No vertical asymptotes exist.
No horizontal asymptotes exist.
Critical point at: $x = -4$
Increasing: $(-\infty, -4)$ Decreasing: $(-4, \infty)$
No inflection points exist.
Concave up: $(-\infty, -4)$, $(-4, \infty)$ Concave down: No intervals exist.
No relative minima. Relative maximum: $(-4, 0)$

2) $f(x) = -(2x + 12)^{\frac{1}{3}}$




$x$-intercept at $x = -6$ $y$-intercept at $y = -\sqrt[3]{12}$
No vertical asymptotes exist.
No horizontal asymptotes exist.
Critical point at: $x = -6$
Increasing: No intervals exist. Decreasing: $(-\infty, \infty)$
Inflection point at: $x = -6$
Concave up: $(-6, \infty)$ Concave down: $(-\infty, -6)$
No relative minima. No relative maxima.

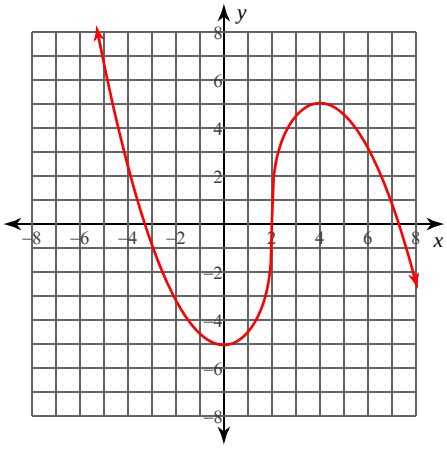
3) $y = \frac{1}{5}(x+4)^{\frac{5}{3}} - 2(x+4)^{\frac{2}{3}}$



$x$-intercepts at $x = -4, 6$ $y$-intercept at $y = -\frac{12\sqrt[3]{2}}{5}$

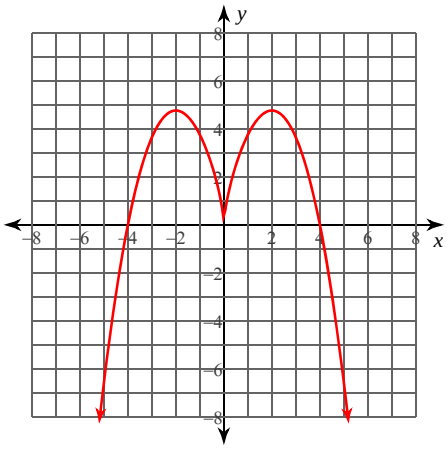
No vertical asymptotes exist.
No horizontal asymptotes exist.
Critical points at: $x = -4, 0$
Increasing: $(-\infty, -4), (0, \infty)$ Decreasing: $(-4, 0)$
Inflection point at: $x = -6$
Concave up: $(-6, -4), (-4, \infty)$ Concave down: $(-\infty, -6)$
Relative minimum: $\left(0, -\frac{12\sqrt[3]{2}}{5}\right)$ Relative maximum: $(-4, 0)$

4) $y = -\frac{1}{6}(x-2)^{\frac{7}{3}} + \frac{14}{3}(x-2)^{\frac{1}{3}}$



$x$-intercepts at $x = 2 - 2\sqrt{7}, 2, 2 + 2\sqrt{7}$ $y$-intercept at $y = -4\sqrt[3]{2}$
No vertical asymptotes exist.
No horizontal asymptotes exist.
Critical points at: $x = 0, 2, 4$
Increasing: $(0, 4)$ Decreasing: $(-\infty, 0), (4, \infty)$
Inflection point at: $x = 2$
Concave up: $(-\infty, 2)$ Concave down: $(2, \infty)$
Relative minimum: $(0, -4\sqrt[3]{2})$ Relative maximum: $(4, 4\sqrt[3]{2})$

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



$x$-intercepts at $x = -4, 0, 4$ $y$-intercept at $y = 0$
No vertical asymptotes exist.
No horizontal asymptotes exist.
Critical points at: $x = -2, 0, 2$
Increasing: $(-\infty, -2), (0, 2)$ Decreasing: $(-2, 0), (2, \infty)$
No inflection points exist.
Concave up: No intervals exist. Concave down: $(-\infty, 0), (0, \infty)$
Relative minimum: $(0, 0)$ Relative maxima: $(-2, 3\sqrt[3]{4}), (2, 3\sqrt[3]{4})$