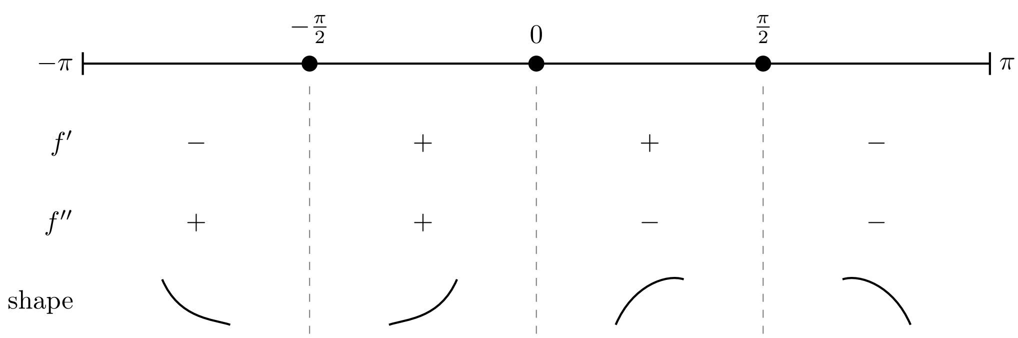
AP Calculus Curve Sketching Practice

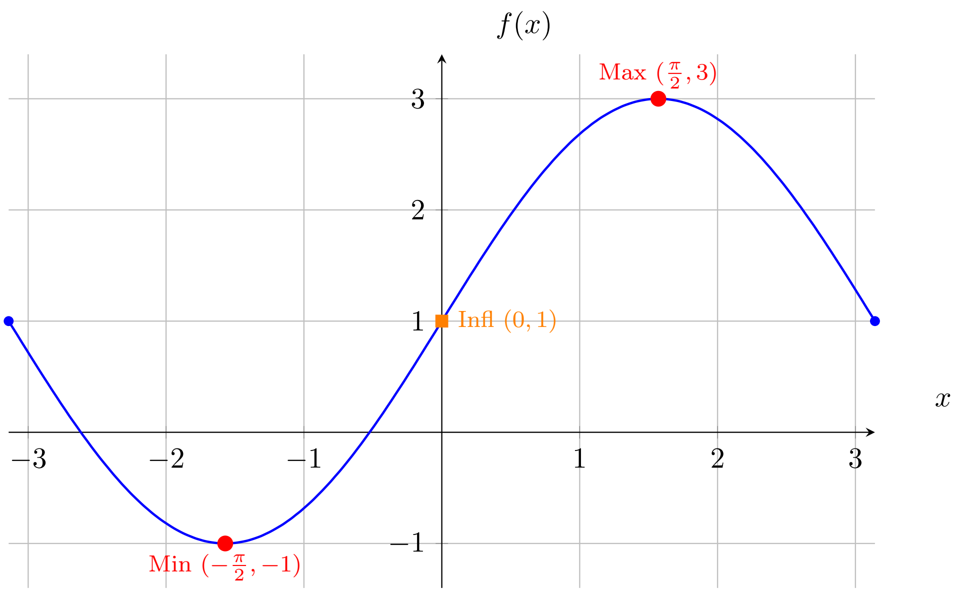
Name: ________________________________ **Date:** ____________

Class Period: ____________

Instructions: Recall that to make a sign chart, you need to identify critical points and inflection points. You should know where the function is undefined, where the respective derivatives are equal to zero, and when the derivatives are undefined.

Example: Complete an accurate sign chart identifying the critical points, points of inflection, minimums, and maximums for the function $f(x) = 2\sin(x) + 1$ on $[-\pi, \pi]$ by using the first and second derivative test. Then, sketch the function using the known point $(0, 1)$.





Practice Problems

1. Complete an accurate sign chart identifying the critical points, points of inflection, minimums, and maximums for the function $f(x) = -\cos(x) - 1$ on $[-\pi, \pi]$ by using the first and second derivative test. Then, sketch the function using the known point $(0, -2)$.

2. Complete an accurate sign chart identifying the critical points, points of inflection, minimums, and maximums for the function $f(x) = x^3 + 3x^2 - 2$ by using the first and second derivative test. Then, sketch the function using the known points$(-3, -2)$ and $(1, 2)$.

3. Complete an accurate sign chart identifying the critical points, points of inflection, minimums, and maximums for the function $f(x) = (x^2 - 9)^{\frac{2}{3}}$ by using the first and second derivative test. Then, sketch the function.

4. Complete an accurate sign chart identifying the critical points, points of inflection, minimums, and maximums for the function $\frac{x^2}{x-2}$ by using the first and second derivative test. Then, sketch the function. *Hint: There is a vertical asymptote at* $x = 2$.

5. Complete an accurate sign chart identifying the critical points, points of inflection, minimums, and maximums for the function $f(x) = x\sqrt{3-x}$ by using the first and second derivative tests. Then, sketch the function using the known points $(0,0), (2,2)$ and $(3,0)$.

6. Complete an accurate sign chart identifying the critical points, points of inflection, minimums, and maximums for the function $f(x) = -x^{\frac{2}{3}}(x-5)$ by using the first and second derivative tests. Then, sketch the function.

7. Complete an accurate sign chart identifying the critical points, points of inflection, minimums, maximums, and the shape of f based on the following description. Then, sketch the graph.

- $f(0) = 0$, $f(2) = -4$, $f(4) = 0$.
- $f'(x) > 0$ on $(-\infty, 0)$ and $(4, \infty)$
- $f'(x) < 0$ on $(0, 4)$
- $f'(0) = 0$ and $f'(4) = 0$
- $f''(x) < 0$ on $(-\infty, 2)$
- $f''(x) > 0$ on $(2, \infty)$

8. Complete an accurate sign chart identifying the critical points, points of inflection, minimums, maximums, and the shape of f based on the following description. Then, sketch the graph.

- $f(-1) = 4$, $f(0) = 0$, $f(1) = 4$.
- $f'(x) < 0$ on $(-\infty, 0)$
- $f'(x) > 0$ on $(0, \infty)$
- $f'(0)$ is undefined
- $f''(x) < 0$ on $(-\infty, 0)$ and $(0, \infty)$