5.7 The Second Derivative Test

Calculus Name: _____ **CA #2**

Find the extrema by using the Second Derivative Test. Justify your answer.

1. $f(x) = x^3 - 3x^2 - 1$

2. $h(x) = x^4 - 4x^2 + 4$

3. $g(x) = 2\sin x + \sqrt{3}x$ on the interval $[0, 2\pi]$

4. $h(x) = -x^3 + x^2 - 4$

Answers to 5.7 CA #2

4. Rel max at $x = 0$ because $f'(0) = 0$ and $f''(0) < 0$. Rel min at $x = 2$ because $f'(2) = 0$ and $f''(2) > 0$.	7. Rel min at $x = -\sqrt{2}$ and $x = \sqrt{2}$ because $f'(\pm\sqrt{2}) = 0$ and $f''(\pm\sqrt{2}) > 0$. Rel max at $x = 0$ because $f'(0) = 0$ and $f''(0) < 0$.
6. Rel max at $x = \frac{5\pi}{6}$ because $f'\left(\frac{5\pi}{6}\right) = 0$ and $f''\left(\frac{5\pi}{6}\right) < 0$. Rel min at $x = \frac{7\pi}{6}$ because $f'\left(\frac{7\pi}{6}\right) = 0$ and $f''\left(\frac{7\pi}{6}\right) > 0$.	7. Rel min at $x = 0$ because $f'(0) = 0$ and $f''(0) > 0$. Rel max at $x = \frac{2}{3}$ because $f'\left(\frac{2}{3}\right) = 0$ and $f''\left(\frac{2}{3}\right) < 0$.