Problem Set 20: Extrema and the First Derivative Test

Find the relative (local) extrema for the following functions (just the x-values). Also state whether the point is a maximum or minimum.

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

2. $g(x) = x^{1/3}(x - 4)$

3. $x(t) = t^2 e^t$

4. $s(p) = p(p^3 - 4p^2 + 4p)$

Find the absolute (global) extrema for the following functions along the given interval. (x and y-values)

5. $f(x) = 3x^2 - 5x + 4$ on the interval $[-2\,,2]$

6. $h(x) = -x^3 + 2x^2$ on the interval $[-1\,,2]$

7. $y = \sin\left(\frac{x}{2}\right) + 1$ on the interval $[-\frac{\pi}{2}, \frac{\pi}{2}]$

8. $w = \sqrt{9 - x^2}$ on the interval $[-3, 3]$