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Give the definition of the following terms. Your answers should be in complete sentences.

[1] global (or absolute) maximum
[2] local (or relative) minimum
[3] critical number
[4] decreasing
[5] concave up
[6] inflection point

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Find all critical numbers of the following functions and, using the first derivative test, classify them as local maxima or local minima or neither. **SHOW ALL WORK.**

[1] $f(x) = x^6 e^{-3x}$

[2] $f(x) = x^{\frac{5}{3}} - 5x^{\frac{2}{3}}$

[3] $f(x) = \dfrac{x}{1+x^4}$

[4] $f(x) = 6x^4 - 8x^3 + 3x^2 - 1$

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Find all inflection points of the following functions. **SHOW ALL WORK.**

[1] $f(x) = \dfrac{x+1}{\sqrt{x}}$

[2] $f(x) = xe^{-x}$

[3] $f(x) = x^4 - 4x^3 + 6x^2 - 1$

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