DO A COMPLETE GRAPH ANALYSIS

In Problems 1–3, discuss absolute extrema on \((0, \infty)\).

1. \(y = x \ln x\) (use the fact that \(\lim_{x \to 0^+} x \ln x = 0\))

2. \(y = x - \ln x\)

3. \(y = \frac{\ln x}{x}\)

4. \(y = \sin x + \cos x\) on \([-\pi, \pi]\).
   After graphing, show, using the addition formula for cosine, that
   \(y = \sqrt{2} \cos(x - \pi/4) = \sin x + \cos x\). Compare with your graph.

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1. \(f(x) = x^2 + \frac{1}{x}\)

2. \(f(x) = 2x^3 - 3x^2\)

3. \(f(x) = x^4 - 2x^2\)

4. \(f(x) = x^3 e^{-x}\) (use the fact that \(\lim_{x \to \infty} x^3 e^{-x} = 0\))