

1. Concave up: $(-\infty, -1), (\frac{1}{2}, \infty)$; Concave down: $(-1, \frac{1}{2})$; Inflection points: $(-1, -2), (\frac{1}{2}, \frac{7}{16})$
2. Concave up: $(-2, 2)$; Concave down: $(-\infty, -2), (2, \infty)$; Inflection points: None
3. Concave up: $(-\infty, -2 - \sqrt{2}), (-2 + \sqrt{2}, \infty)$; Concave down: $(-2 - \sqrt{2}, -2 + \sqrt{2})$; Inflection points: $(-3.41, 0.38), (-0.59, 0.19)$
4. Concave up: $(-\sqrt{3}, \sqrt{3})$; Concave down: $(-\infty, -\sqrt{3}), (\sqrt{3}, \infty)$; Inflection points: $(-\sqrt{3}, \sqrt[3]{4}), (\sqrt{3}, \sqrt[3]{4})$
5. Concave up: $(e^{3/2}, \infty)$; Concave down: $(0, e^{3/2})$; Inflection point: $(e^{3/2}, \frac{3}{2e^{3/2}})$
6. Concave up: $(\frac{\pi}{4}, \frac{5\pi}{4})$; Concave down: $[0, \frac{\pi}{4}), (\frac{5\pi}{4}, 2\pi]$; Inflection points: $(\frac{\pi}{4}, 0), (\frac{5\pi}{4}, 0)$
7. Concave up: $(-\infty, 0), (1, \infty)$; Concave down: $(0, 1)$; Inflection points: $(0, 0), (1, 9)$
8. Local max at $(-2, 13)$, Local min at $(1, -14)$
9. Local max at $(-1, -3)$, Local min at $(1, 5)$
10. Local min at $(\frac{1}{\sqrt[3]{e}}, -\frac{1}{3e})$