HW 3.4 Concavity and the Second Derivative Test

In 1-8, find the points of inflection and discuss the concavity of the graph of the function.

12. $f(x) = 2x^3 - 3x^2 - 12x + 5$
14. $f(x) = 2x^4 - 8x + 3$
16. $f(x) = x^3(x-4)$
18. $f(x) = x\sqrt{x+1}$
20. $f(x) = \dfrac{x+1}{\sqrt{x}}$
22. $f(x) = 2\csc\dfrac{3x}{2},\ (0, 2\pi)$
24. $f(x) = \sin x + \cos x,\quad [0, 2\pi]$
26. $f(x) = x + 2\cos x,\quad [0, 2\pi]$

In 9-15, find all the relative extrema. Use the Second Derivative Test where applicable.

28. $f(x) = x^2 + 3x - 8$
30. $f(x) = -(x-5)^2$
32. $f(x) = x^3 - 9x^2 + 27x$
34. $g(x) = -\dfrac{1}{8}(x+2)^2(x-4)^2$
36. $f(x) = \sqrt{x^2+1}$
38. $f(x) = \dfrac{x}{x-1}$
40. $f(x) = 2\sin x + \cos 2x,\ [0, 2\pi]$