6. $y = x^4 + \frac{8}{3}x^3 + 2x^2$

$y' = 4x^3 + 8x^2 + 4x$

$= 4x(x^2 + 2x + 1)$

$= 4x(x+1)^2$

$y' = DNE$? Nope

$y' = 0$: $x = 0$ or $x = -1$

f': $-$ | -1 | $-$ | 0 | $+$

$\boxed{\begin{array}{l} f \text{ is inc on } (0,\infty) \\ \quad \text{dec on } (-\infty,0) \end{array}}$

$\boxed{x = 0,\ f(0) = 0 \text{ is a local min}}$

$y'' = 12x^2 + 16x + 4$

$= 4(3x^2 + 4x + 1)$

$= 4(3x+1)(x+1)$

$y'' = DNE$? Nope

$y'' = 0$: $x = -\frac{1}{3}, -1$

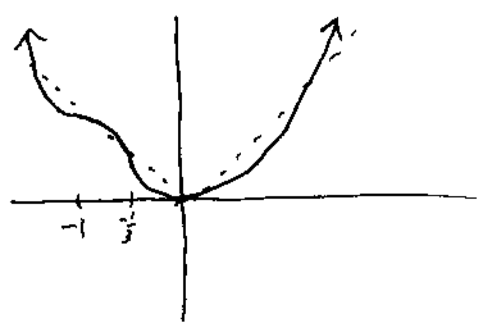
f'': $+$ | -1 | $-$ | $-\frac{1}{3}$ | $+$

$\boxed{\begin{array}{l} f \text{ is concave up on } (-\infty,-1), (-\frac{1}{3},\infty) \\ \quad \text{" down on } (-1,-\frac{1}{3}) \end{array}}$

$\boxed{x = -1, -\frac{1}{3} \text{ are pts of inflection}}$

$y = x^4 + \frac{8}{3}x^3 + 2x^2$

$(0,0)$ is on the graph



7. $y = x^5 - \frac{1}{4}x^4 + 2$

$y' = 5x^4 - x^3 = x^3(5x-1)$

$x = 0,\ x = \frac{1}{5}$

f': $+$ | 0 | $-$ | $\frac{1}{5}$ | $+$

$\boxed{\begin{array}{l} f \text{ inc on } (-\infty,0), (\frac{1}{5},\infty) \\ \text{dec on } (0,\frac{1}{5}) \end{array}}$

$\boxed{\begin{array}{l} x = 0,\ f(0) = 2 \text{ local max} \\ x = \frac{1}{5},\ f(\frac{1}{5}) \approx \cancel{2}\ 1.99 \text{ local min} \end{array}}$

$y'' = 20x^3 - 3x^2 = x^2(20x-3)$

$x = 0,\ x = \frac{3}{20}$

f'': $-$ | 0 | $-$ | $\frac{3}{20}$ | $+$

$\boxed{\begin{array}{l} f \text{ is concave up on } (\frac{3}{20},\infty) \\ \quad \text{" down on } (-\infty,0)(0,\frac{3}{20}) \end{array}}$

$\boxed{x = \frac{3}{20},\ f(\frac{3}{20}) \approx 2 \text{ is pt of infl.}}$

f