Math 251 L02 Fall 2004 Tuesday Lab.

Quiz #4 Duration: 35 minutes

[Marks] Total marks = 30

[4] 1. Let $y = e^{(x^2 \ln x)}$. Find $\frac{dy}{dx}$.

2. Given: $f(x) = \frac{1}{x(x+1)}$, $f'(x) = \frac{-(2x+1)}{x^2(x+1)^2}$, $f'' = \frac{2(3x^2+3x+1)}{x^3(x+1)^3}$.

[3] (a) Find all vertical and horizontal asymptotes of f.

[2] (b) Find all intervals where f is increasing or decreasing.

[2] (c) Find the (x, y) coords. of all relative extrema of f.

[3] (d) Find all intervals where f is concave up or concave down.

[8] (e) Sketch the graph of f.

[8] 3. Given $f(x) = (x+2)e^x$, $f'(x) = (x+3)e^x$, $f''(x) = (x+4)e^x$.

Sketch the graph of f. Label all points on the graph which are inflection points or relative extrema.

# Math 251 L02 Fall 2004 Tues. Lab
## Quiz #4 Solutions

1. $y' = (2x \ln x + x)\, e^{x^2 \ln x}$.

2. (a). H.A. $y = 0$. V.A. $x = 0$ & $x = -1$.

(b) $f'$ : $+$ on $(-\infty, -1)$, $+$ on $(-1, -\frac{1}{2})$, $-$ on $(-\frac{1}{2}, 0)$, $-$ on $(0, \infty)$ (test points $-1$, $-\frac{1}{2}$, $0$)

Inc. $(-\infty, -1) \cup (-1, -\frac{1}{2}]$

Dec. $[-\frac{1}{2}, 0) \cup (0, \infty)$.

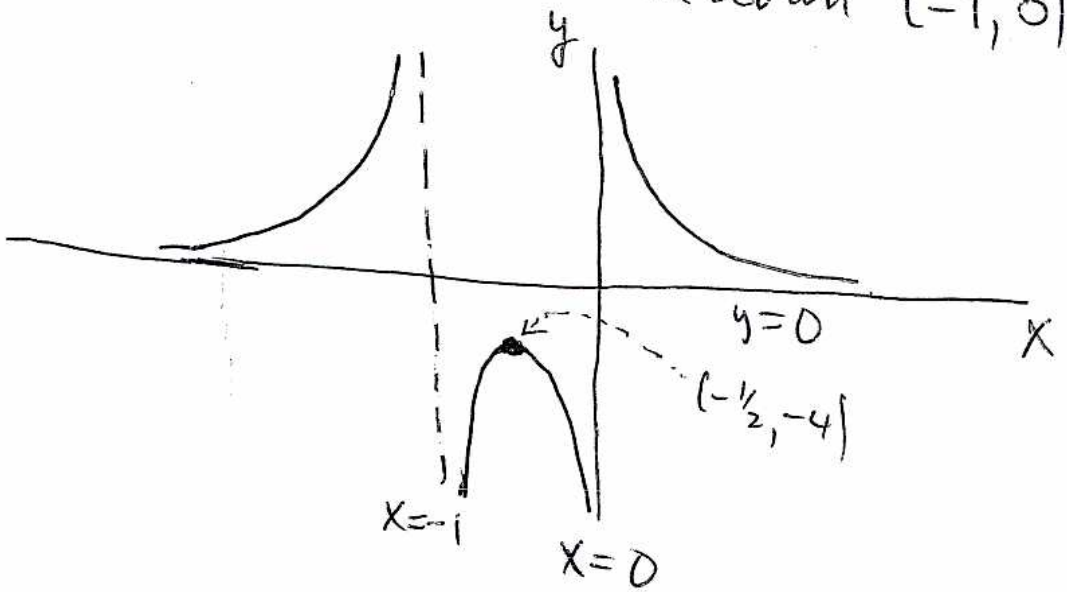
(c) Rel. max at $(-\frac{1}{2}, -4)$.

(d) $f''$ : $+$ on $(-\infty, -1)$, $-$ on $(-1, 0)$, $+$ on $(0, \infty)$ (test points $-1$, $0$)

C. up. $(-\infty, -1) \cup (0, \infty)$

C. down $(-1, 0)$.

(e)




3. $f'$ : $-$ on $(-\infty, -3)$, $+$ on $(-3, \infty)$ (test point $-3$)

$f''$ : $-$ on $(-\infty, -4)$, $+$ on $(-4, \infty)$ (test point $-4$)