

4.3 Day 2

Tuesday, November 13, 2012
7:10 AM

Section 4.3

p. 215: 13, 15, 17, 22, 24, 26, 30, 39, 41

13. $y = xe^x$

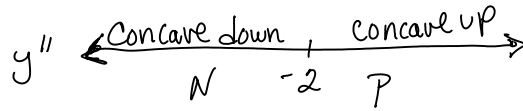
$y' = xe^x + e^x$

$y'' = xe^x + e^x + e^x$

$0 = xe^x + 2e^x$

$0 = e^x(x+2)$

$x = -2$ cr



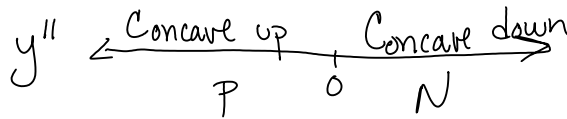
$y = -2e^{-2} = \frac{-2}{e^2}$

This is a point of inflection on y of $(-2, \frac{-2}{e^2})$ because y'' changes signs at $x = -2$.

$(-2, \frac{-2}{e^2})$

15. $y = \tan^{-1}x$

$y' = \frac{1}{x^2+1} = (x^2+1)^{-1}$



$y = \tan^{-1}(0) = 0$

$y'' = -(x^2+1)^{-2} \cdot 2x = \frac{-2x}{(x^2+1)^2}$

Point of inflection (0,0)

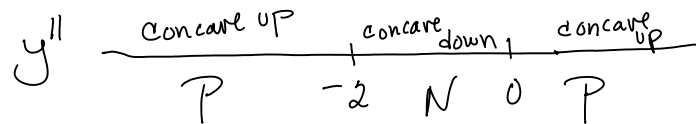
$0 = \frac{-2x}{(x^2+1)^2}$

$x = 0$

17. $y = x^{1/3}(x-4) = x^{4/3} - 4x^{1/3}$

$y' = \frac{4}{3}x^{1/3} - \frac{4}{3}x^{-2/3}$

or $y' = \frac{4x-4}{3x^{2/3}}$



$y'' = \frac{4}{9}x^{-2/3} + \frac{8}{9}x^{-5/3}$

$= \frac{4x+8}{9x^{5/3}}$

$= \frac{4x+8}{9x^{5/3}}$

$\frac{4x+8}{9x^{5/3}} = 0$

$4x+8=0$
 $x = -2$ cr

y'' is und $x=0$ cr

$y = (-2)^{1/3}(-2-4)$
 $= -\sqrt[3]{-2} = \sqrt[3]{2}$

$y = 0^{1/3}(0-4) = 0$

points of inflection

$(-2, \sqrt[3]{2})$ and $(0,0)$

22. $f'(x) = 0$ $x = \pm 1, 2, 3$

24. $[-2, 2]$

22a $f'(x)=0 \Rightarrow x = \pm 1.25, 0$
 positive $(-1.25, 0) \cup (1.25, \infty)$
 negative $(-\infty, -1.25) \cup (0, 1.25)$

b. $f''(x)=0 \Rightarrow x = \pm 0.7$
 pos. $(-\infty, -0.7) \cup (0.7, \infty)$
 neg. $(-0.7, 0.7)$

24a $[-2, 2]$
 b. $(-\infty, -2] \cup [2, \infty)$
 c. local min. $\Rightarrow x = -2$
 Local max $\Rightarrow x = 2$

26. $x(t) = 6 - 2t - t^2$
 a. $x'(t) = v(t) = -2 - 2t$

b. $x''(t) = v'(t) = a(t) = -2$

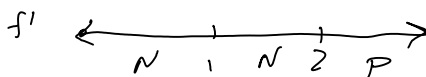
c. the particle begins @ 6 and moves in the negative direction for all values of t in the domain.

30a. $v(t)=0 \Rightarrow t = -0.2, t = 4 \text{ \& } t = 12$

b. $a(t)=0 \Rightarrow t = 1.5, t = 5.2, t = 8, t = 11, \text{ and } t = 13$

39. $y' = (x-1)^2(x-2)$

a. $0 = (x-1)^2(x-2)$
 $x = 1 \quad x = 2$



a. No local max

b. local & absolute min @ $x = 2$

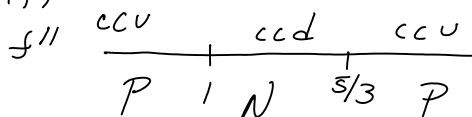
c. $y'' = (x-1)^2(1) + (x-2)(2(x-1)(1))$

$0 = (x-1)^2 + 2(x-1)(x-2)$

$0 = (x-1)((x-1) + 2(x-2))$

$0 = (x-1)(3x-5)$

$x = 1 \quad x = 5/3$



The points of inflection occur @ $x = 1 \text{ \& } x = 5/3$

