B.A is B.S
Will Arbito
Ryan Zhao

4. $f(x) = \frac{x^2}{(x-2)^2}$ $\frac{x^2}{x^2-4x+4}$

a) horizontal and vertical

$\frac{x^2}{x^2-4x+4} = \frac{\infty}{\infty} = 0$ horizontal = 1

vertical = 2

$x = 2 \quad (2-2) = 0$

b) When does it increase/decrease

$\frac{dx}{dy} \quad f(x) = \frac{2x}{2(x-2)(1)} = \frac{x}{2x-2}$ $= \frac{-1}{2-4} = \frac{-1}{-6} = \frac{1}{6}$

$\frac{0}{6-4} = 0$ $\frac{1}{-2} = \frac{1}{-1} = -1$

+ + − +

c) local max/min

$\frac{3}{6-4}$ $f(x) \frac{x^2}{(x-2)^2} = \frac{2x}{(x^2-2)}$ $f'(x) = 0$

$x = 0$

$(x-2)^3 = 0$ local min: 0

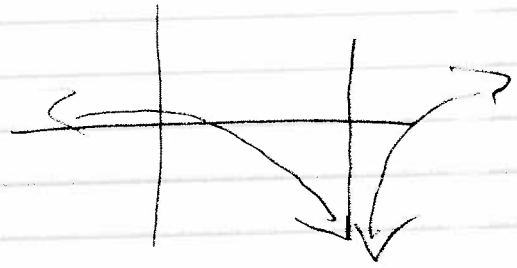
local max: DNE

d) intervals of concavity and the inflections points

$f(x) = \frac{9}{(x^2-2)^3}$

$f''(x) = 9(x-2)^3$

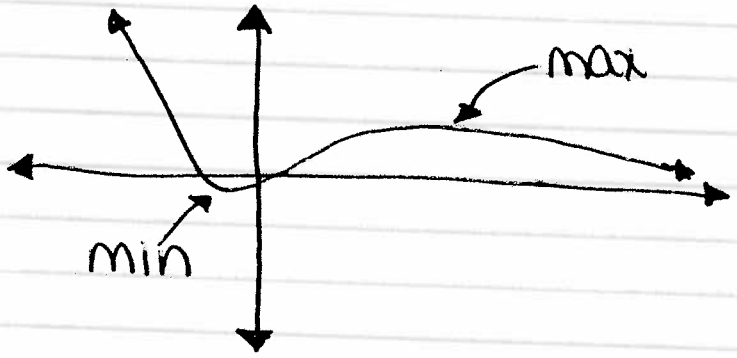
e) information from parts (a) - (d) to sketch



#10 (56)

The New Group

$f(x) = x^2 e^{-x}$



Rough estimate minimum -.053
Rough estimate maximum 2.02

$f'(x) = 2xe^{-x} + x^2e^{-x}$

$f'(x) = 2xe^{-x} - x^2e^{-x}$

$f'(x) = e^{-x}(2x - x^2) = 0$

$xe^{-x}(2 - x) = 0$

min $x = 0$ $\quad 2 - x = 0$

$x = 2$ max

4.3
#58

TEAM: C·A·M·

CASANOVA LUCERO
Augustin Ciocoiasan
MAYA KHOSBAYAR

$f(x) = x^3(x-2)^4$

a) $f'(x) = 3x^2(x-2)^4 + x^3 \cdot 4(x-2)^3$

$= x^2(x-2)^3[3(x-2) + x^4]$

$x^2(x-2)^3[3x-6+4x]$

$x^2(x-2)^3(7x-6)$

$f'(x) = 0$ $\quad x^2 = 0 \quad x = 0$

$(x-2)^3 = 0 \quad x = 2$

$7x+6 = 0 \quad x = 6/7$

b) $f'(x) = x^2(x-2)^3(7x-6)$

$f''(x) = 2x(x-2)^3(7x-6) + x^2 \cdot 3(x-2)^2(7x-6) + x^2(x-2)^3 +$

$f''(x) = x(x-2)^2[2(x-2)(7x-6) + 3x(7x-6) \times (x-2)7]$

$f''(x) = x(x-2)^2[14x^2 - 2x - 12x + 12 + 21x^2 - 18x + 7x^2 - 14x]$

$f''(x) = x(x-2)^2[4x^2 + 72x + 12]$

$\downarrow \quad \downarrow$

$0 \quad 0$

Quadratic Formula

$\frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$= \frac{-72 \pm \sqrt{3168}}{84}$

$= \frac{-72 \pm \sqrt{(72)^2 - 4(42)(12)}}{2(42)}$

$= \frac{-72 \pm 56.28}{84}$

$= \frac{-72 \pm \sqrt{5184 - 2016}}{84}$

$= \frac{-72 + 56.28}{84} = -.187$

$\frac{-72 - 56.28}{84} = -1.527$

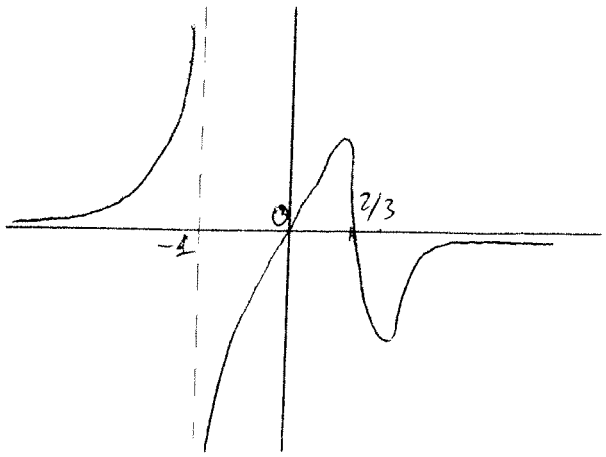
FR3CH

4.3 # 60 :

Estimate intervals of concavity of

$$f(x) = \frac{x^2 \tan^{-1} x}{1 + x^3}$$

Use calculator we have the graph of $f''(x)$ below



Based on the graph we can estimate that :

$f(x)$ is concave up when $x < -1$ since $f''(x) > 0$

$f(x)$ is concave down when $-1 < x < 0$ since $f''(x) < 0$

$f(x)$ is concave up when $0 < x < 2/3$ since $f''(x) > 0$

$f(x)$ is concave down when $x > 2/3$ since $f''(x) < 0$

#62

[illegible]

a) $f'(3) = 2$, $f''(3) = 4$

Getting hotter , Not going to stop

b) $f'(3) = 2$, $f''(3) = -4$

Getting hotter, then cooling down / level OFF

c) $f'(3) = -2$, $f''(3) = 4$

Getting cooler , Then getting hotter

d) $f'(3) = -2$, $f''(3) = -4$

Getting cooler , Then getting [illegible]

Pair Esp'chan
Sam Tabia
Tiejun Wen