I. FIND THE ABSOLUTE EXTREMA FOR THE GIVEN FUNCTION ON THE GIVEN CLOSED INTERVAL.

1. $f(x) = x^4 - 4x^2 - 12$ on $[-2,1]$

2. $f(x) = \dfrac{x^2}{x-2}$ on $[3,6]$

3. $f(x) = (x-3)^{2/3} + 2$ on $[-5,4]$

II. USE THE SECOND DERIVATIVE TEST TO FIND AND CLASSIFY THE RELATIVE EXTREMA FOR THE GIVEN FUNCTIONS.

3. $f(x) = x^4 - 32x^2 - 4$

4. $f(x) = x + 2\cos(x)$ on $(0,3\pi)$

NOTE! ↑

III. FIND THE (OPEN) INTERVALS OF INCREASE AND DECREASE AND THE RELATIVE EXTREMA (IF ANY) FOR THE GIVEN FUNCTIONS.

5. $f(x) = 3x(x-5)^{2/3}$ on $(-\infty,\infty)$ NOTE: FOR THIS FUNCTION, $f'(x) = \dfrac{5x-15}{\sqrt[3]{x-5}}$

6. $f(x) = \sin^2(x)$ on $(0,\frac{3\pi}{2})$

NOTE! ↑

IIII. FOR THE GIVEN FUNCTION, FIND:

7. THE (OPEN) INTERVALS OF CONCAVITY

8. THE INFLECTION POINTS (IF ANY)

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

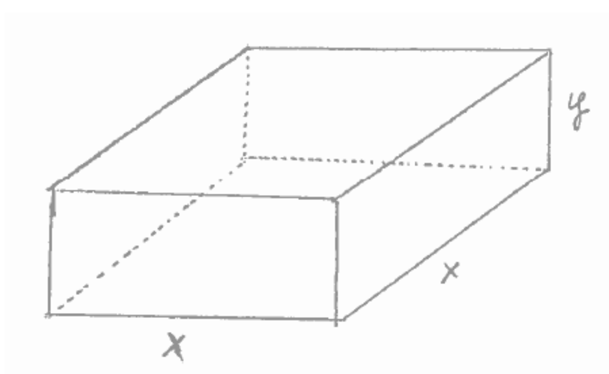
NOTE: FOR THIS FUNCTION, $f'(x) = \dfrac{-8x}{(x^2-4)^2}$ AND $f''(x) = \dfrac{24x^2+32}{(x^2-4)^3}$

VI. SOLVE USING THE METHODS DISCUSSED IN CLASS.

9. A BOX IS TO BE MADE SO THAT ITS BASE IS SQUARE AND THE SUM OF THE WIDTH, LENGTH AND DEPTH IS 150cm. FIND THE DIMENSIONS OF THE BOX WHICH MEETS THESE REQUIREMENTS AND HAS THE MAXIMUM POSSIBLE VOLUME.

VI. SOLVE USING THE METHODS DISCUSSED IN CLASS.

13. A BOX IS TO BE MADE SO THAT ITS BASE IS SQUARE AND THE SUM OF THE WIDTH, LENGTH AND DEPTH IS 150cm. FIND THE DIMENSIONS OF THE BOX WHICH MEETS THESE REQUIREMENTS AND HAS THE MAXIMUM POSSIBLE VOLUME.



14. IN THE CORNER OF THE BARN LOT, A FARMER WANTS TO BUILD PENS AS SHOWN IN THE DIAGRAM. IF THERE ARE 600 FEET OF FENCING AVAILABLE, WHAT DIMENSIONS SHOULD EACH OF THE SMALLER PENS HAVE SO THAT THE TOTAL SURFACE AREA ENCLOSED IS MAXIMAL? NOTE THAT **NO FENCE IS REQUIRED ALONG THE SIDE OF THE BARN AND ALL PENS ARE THE SAME SIZE**.