Chapter 03_Assignment

Ex 1:

Find the critical number of the functions

a/ $y = |3x - 4|$

b/ $f(x) = x \ln x$

c/ $f(p) = \dfrac{p-1}{p^2+4}$

d/ $y = x^{4/5}(x-4)^2$

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Ex 2:

Find the absolute maximum and absolute minimum value of $f(x)$ on the given interval.

a/ $f(t) = t\sqrt{4-t^2}, \ [-1,2]$

b/ $f(x) = \dfrac{x}{x^2-x+1}, \ [0,3]$

c/ $f(x) = x - \ln x, \ \left[\dfrac{1}{2}, 2\right]$

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Ex 3:

Find all numbers that satisfy the conclusion of the Mean Value Theorem

a/ $f\left(x\right)=3x^2+2x+5,\left[-1,1\right]$

b/ $f\left(x\right)=x^3-3x+2,\left[-2,2\right]$

c/ $f\left(x\right)=\sqrt[3]{x},\left[0,1\right]$

d/ $f\left(x\right)=\dfrac{1}{x},\left[1,3\right]$

Ex 4:

Find all numbers that satisfy the conclusion of the Rolle's Theorem

a/ $f\left(x\right)=x\sqrt{x+2},\left[-2,0\right]$

b/ $f\left(x\right)=\left(x-2\right)x^2,\left[0,2\right]$

Ex 5:

If $f(1) = 10$ and $f'(x) \geq 2, \forall x \in [1, 4]$, how small can $f(4)$ possibly be ?

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Ex 6:

Find where the function $f\left(x\right)=3x^4-4x^3-12x^2+1$ is increasing and where it is decreasing.

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Ex 7:

Find the inflection points for the function

a/ $y = x^4 - 4x + 1$

b/ $f(x) = x^6$

c/ $f(x) = xe^x$

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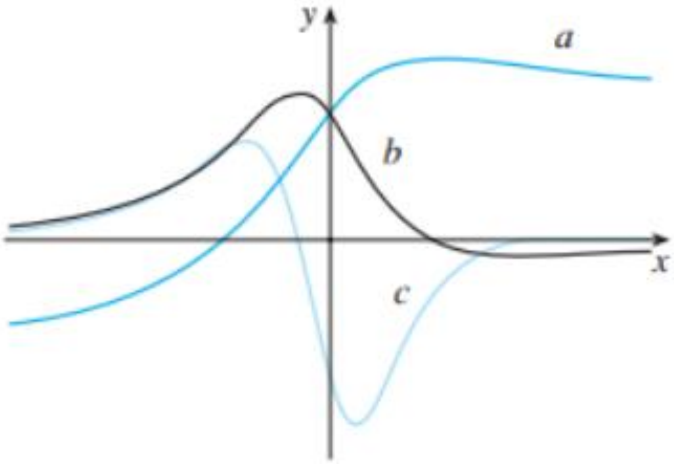
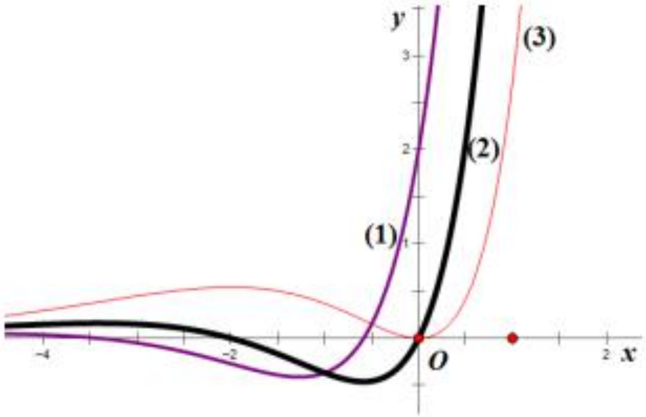
Ex 8:

The figure shows the graphs of f, f' and f'' Identify each curve, and explain your choices

a.



b.



Ex 9:

a/ Find two numbers whose difference is 100 and whose product is a minimum.

b/ If 1200 cm of material is available to make a box with a square base and an open top, find the largest possible volume of the box.

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Ex 10:

a/ Find the dimensions of a rectangle with perimeter 100 m whose area is as large as possible ?

b/ Find the dimensions of a rectangle with area 100 m^2 whose perimeter is as small as possible ?

c/ A box with a square base and open top must have a volume of 32,000 cm^3 . Find the dimensions of the box that minimize the amount of material used ?

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Ex 11:

a/ A rectangular storage container with an open top is to have a volume of 10 m^3 . The length of its base is twice the width. Material for the base costs $10 per square meter. Material for the sides costs $6 per square meter. Find the cost of materials for the cheapest such container.

b/ Find the point on the parabola $y^2 = 2x$ that is closest to the point $(1, 4)$

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Ex 12:

Use Newton's method with the specified initial approximation x_1 to find x_3

a/ $x^3 + 2x - 4 = 0, x_1 = 1$

b/ $x^5 + 2 = 0, x_1 = -1$

c/ $\ln\left(x^2 + 1\right) - 2x - 1 = 0, x_1 = 1$

d/ $\ln\left(4 - x^2\right) = x, x_1 = 1$