

DAV COLLEGE
 MAHARAJA GANESH DAS
 Final Examination

Mathematics I
Calculus I Commerce

Date: _____

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It is given that the function is continuous at $x = 3$. Find the value of k .

(4 marks) $f(x) = \frac{x^2 - k}{x^2 - 3}$

(4 marks) $f(x) = \frac{k - 3}{x - 3}$

(5 marks) Differentiate the function $f(x) = x^2$ using the first principle method.

(4 marks) Find the derivative of $f(x) = x^3$ using the first principle method.

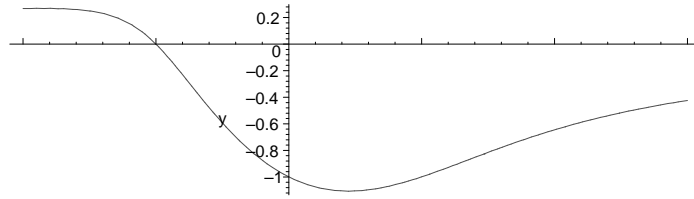
(5 marks) Find the derivative of $f(x) = \frac{x^2}{x} - \frac{x^2}{x}$.

(5 marks) Find the derivative of $f(x) = \ln x^2 \cos^3 x$ using the first principle method.

(5 marks) Given that $f(x) = \frac{1}{x-1}$ is continuous at $x = 1$, find the value of k .

(5 marks) Compute the derivative of $f(x) = e^{x^2} \sin x$.

(5 marks)



✓ (4 marks) Compute the own integral $\int \left(x^{2/3} e^x - \frac{1}{x^2} \right) dx$

✓ Consider the function $f(x) = x^4 - x^3$

✓ (1 mark) Give the domain of f

✓ (3 marks) Find the x-intercepts and any other y-intercept

✓ (3 marks) Find the intervals where f is increasing and the intervals where f is decreasing

✓ (1 mark) Find the local maxima and local minima

✓ (4 marks) Find the intervals where f is concave up and the intervals where f is concave down. Give the inflection points.

✓ (4 marks) Use the information above to sketch the graph of f . Your graph should agree with the previous answers. Carry out the coordinate system for the graph. Use the x-intercepts and the inflection points.

ANSWERS:

✓ a) \mathbb{R} b) \mathbb{R} $x - \int x^2 \frac{1}{x} - \frac{1}{x^2}$ $f(x) = x^4 - x^3$

✓ $f(x) = x^3 \cos x - x^2 \sin x^3$ $\frac{1}{x - x^2}$ $f(x) = \frac{1}{x - 1}$ $f(x)$

✓ M_1 and M_2 —

✓ $f(x) = x^2 - 12x^2$ $x - 1/3 \left(\frac{x}{x^2 - 1} - \frac{x}{x^2 - x} - \frac{1}{x - 1} \right)$

✓ a) $E = \frac{1}{2}$ b) It will cause the revenue to increase $y = -x - -$

✓ b) $P = M$ so that actual profit is zero production and sales are the same $f(x) = x^2 - x^3$

✓ approx f persons per week

✓ No horizontal asymptote two vertical asymptotes $x = 1$ and $x = -1$

✓ $-x^{5/3} e^x - \frac{1}{x} + C$

✓ a) $R = 1$ b) y intercept M_1 and x intercepts M_2 and M_3 , c) f is increasing on M_1 and decreasing on M_2 , - local minima M_3 and no local maxima **d) (x)-4.24927J/R9 11.**