Review problems

Math 207 Fall 2007

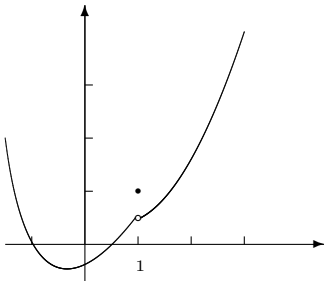
Here are some suggested review problems for the final exam. Please realize that the problems are only designed to be suggestions to help students to prepare for the final exam. Students should study **all** topics covered in class.

P 1 Find $\lim_{x\to\infty} \dfrac{2x^2+2x}{x^3-x}$

P 2 Find $\lim_{x\to 3} \dfrac{x^2-9}{2x-6}$

P 3 Find $\lim_{x\to 5} \dfrac{4}{\ln(x-4)}$

P 4 For the function f graphed here:



Study $\lim_{x\to 1} f(x)$, continuity and differentiability at $x = 1$

P 5 Find the equation of the horizontal and vertical asymptotes (if any) of $f(x) = \dfrac{x^2-5x+6}{x-2}$

P 6 Find the equation of the horizontal and vertical asymptotes (if any) of $f(x) = e^{x-3}$

P 7 Find the derivative of $f(x) = \dfrac{3x^2+5}{4x+1}$

P 8 Find the derivative of $f(x) = \dfrac{e^x}{x+5}$

P 9 Find the derivative of $f(x) = \dfrac{\ln x}{x}$

P 10 Find the derivative of $f(x) = 7^x \ \sin x$

P 11 Find the derivative of $f(x) = \tan x \ \csc x$

P 12 Find the derivative of $f(x) = e^{\left(\frac{x}{x+5}\right)}$

P 13 Find the derivative of $f(x) = \cos(\ln x)$

P 14 Find the derivative of $f(x) = \tan(e^x)$

P 15 Find the derivative of $f(x) = \arcsin(5x)$

P 16 Find $\dfrac{dy}{dx}$ for the function y implicitly defined by $3y + x^2 = y^2$

P 17 Find $\dfrac{dy}{dx}$ for the function y implicitly defined by $\tan y = x + \sin y$

P 18 Find the derivative of $f(x) = x^x$

P 19 Find the derivative of $f(x) = (\sin x)^x$

P 20 Find the **second** derivative of $f(x) = x^3 + 4x^2 - 5x + 4$

P 21 Find the **second** derivative of $f(x) = \ln x$

P 22 The height (in feet) reached by an object moving straight up after t seconds is given by the function $h(t) = -16t^2 + 160t + 129$.

a) After how many seconds the object reaches its highest point?

b) Find the highest height reached.

P 23 Find the rate of change of the **volume** of a cube when the side is 2 cm knowing that the side is changing at the rate of 3 cm/s.

P 24 For the function $f(x) = 4x^3 - 27x + 1$ find minima, maxima, intervals where is increasing and decreasing, inflection points and intervals of positive and negative concavity.

P 25 For the function $f(x) = e^{2x}$ find minima, maxima, intervals where is increasing and decreasing, inflection points and intervals of positive and negative concavity.

P 26 For the function $f(x) = \dfrac{x^2 - 1}{x - 2}$ find minima, maxima, intervals where is increasing and decreasing, inflection points and intervals of positive and negative concavity.

P 27 Find the equation of the tangent line to $f(x) = x^3 - 5$ at $x = 2$.

P 28 Write the linearization of $f(x) = 5x\ e^x$ at $x = 0$.

P 29 Determine $\lim_{x\to\infty} \dfrac{e^x}{x^2}$

P 30 Determine $\lim_{x\to\infty} \dfrac{2x+1}{\ln x}$

P 31 Find the antiderivative of $f(x) = x^4 + \dfrac{3}{x} - \dfrac{1}{x^2+1}$

P 32 Find $\int (5x-1)^4 dx$

P 33 Find $\int \dfrac{1}{3x+1} dx$

P 34 Find $\int \dfrac{\sin x}{\cos x} dx$

P 35 Find $\int_1^2 x^2 - 5x\ dx$

P 36 Find $\int_0^1 e^{5x}\ dx$

P 37 Find $\int_0^1 3^x \sqrt{3^x}\ dx$

P 38 Find the average of $f(x) = \dfrac{x}{x^2+1}$ on the interval $[0, 1]$

P 39 Find $\int_1^e \dfrac{\cos(\ln x)}{x}\ dx$

P 40 Find $\int_0^\pi 2\sin x - \cos x\ dx\ dx$