

Mathematics 1 - 2. test (dif.)

var. 1

full name:

1. Compute the limit of a sequence:

$$\lim_{n \rightarrow \infty} \frac{5n^2 - 1}{3n^3 - n^2 + 5}$$

.....

2. Compute the limit of a function:

$$\lim_{x \rightarrow 0} \frac{\arctan(x)}{2x}$$

.....

3. Compute the first derivative:

$$f(x) = \frac{\sqrt{x^3} \sqrt[3]{x}}{x}$$

.....

4. Compute the first derivative:

$$f(x) = \cos^2(5x)$$

.....

5. Find an equation of a tangent to $f(x) = \cos(x)$

at the point $x_0 = \pi/2$

.....

6. Find an interval (as max. as possible), on which the function is increasing:

$$f(x) = (x - 1)e^{(x+1)}$$

.....

7. Find an interval (as max. as possible), on which the function is convex:

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

.....

8. Find the slope of an oblique asymptote to the function:

$$f(x) = x + \frac{\ln(x)}{x}$$

.....

9. Find the equation of vertical asymptote:

$$f(x) = \frac{1}{9-x^2}$$

.....

10. Write the 3rd degree Taylor's polynomial of a function:

$$f(x) = \cos(x), \text{ at point } x_0 = 0$$

.....