KOÇ UNIVERSITY

FALL 2017 MATH102

MIDTERM 1 November 1, 2017

Duration of the exam: 75 minutes

Instructions: Calculators are not allowed. No books, no notes, no talking allowed. Explain your answers to get full credit. You can use the back of these pages.

Name, Surname: _____

Signature: _____

Section: ☐ 1 (Mo & We 14.30-15.45) ☐ 2 (Mo & We 16.00-17.15)

Problem	**Points**	**Score**
1	30	
2	20	
3	25	
4	25	
Total	**100**	

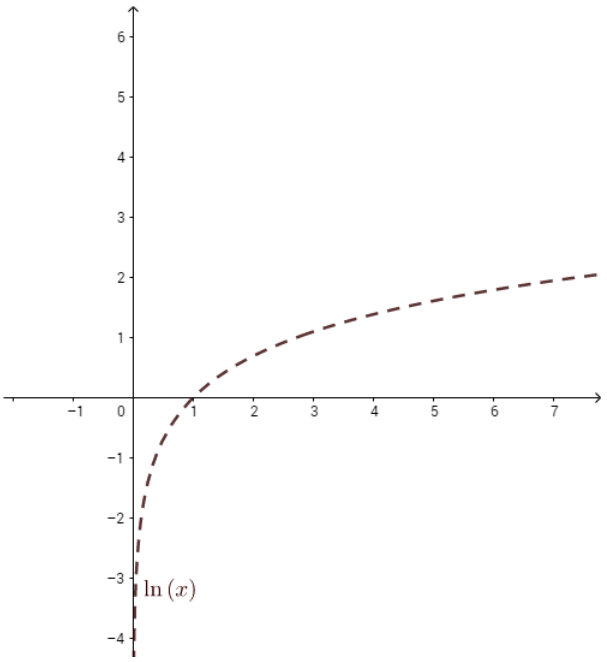
Problem 1

a) Find the domain of the function $g(t) = \sqrt{3-2t} - \sqrt{2+3t}$ (5 points)

b) Find a formula for the inverse of the function $y = \dfrac{e^x}{1+2e^x}$ (10 points)

c) Solve for x in the equation: $e^{4x} = 5e^{2x}$ (5 points)

d) Sketch the graph of $f(x) = 1 - \ln(x-2)$. Determine the domain and range of f. Where does the graph of $f(x)$ intersect the x-axis?
(Below is the graph of $ln(x)$) (10 points)



Problem 2

a) Evaluate the limit, if it exists. (5 points)

$$\lim_{x \to -3} \frac{x^2 + x - 6}{x^2 - x - 12}$$

b) Evaluate the limit, if it exists. (5 points)

$$\lim_{x \to -2} \frac{2 - |x|}{2 + x}$$

c) Evaluate the limit, if it exists. (10 points)

$$\lim_{h \to 0} \frac{\dfrac{1}{(x+h)^2} - \dfrac{1}{x^2}}{h}$$

Problem 3

a) Find the limit. (10 points)

$$\lim_{t\to\infty} \frac{5t - 4t\sqrt{t}}{3t^{\frac{3}{2}} + 3t - 4\sqrt{t}}$$

b) Find the derivative f'. (5 points)

$$f(z) = e^{\frac{z^2}{z+1}}$$

c) Find the derivative s'. (10 points)

$$s(t) = \sqrt{\frac{1+\sin t}{1+\cos t}}$$

Problem 4

a) Find an equation of the tangent line to the curve (10 points)

$$y = \sqrt{1 + x^2 - 2x + x^3}$$

at the point $(2, 3)$.

b) Find y' and y''. (15 points)

$$y = \frac{1}{(1 + \tan x)^2}$$