

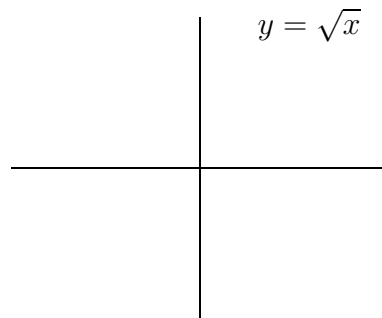
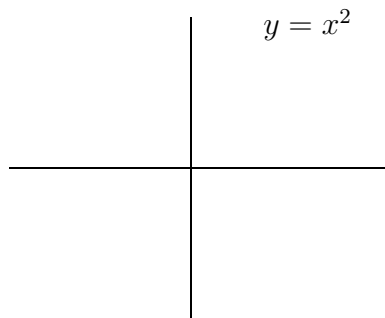
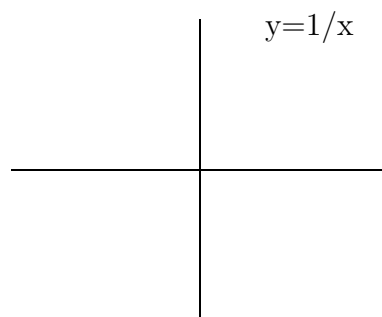
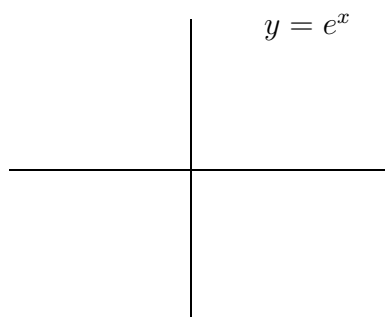
Quiz No.1

student:

Problem 1: Give an example of an increasing function with domain the set of all real numbers \mathbb{R} and range the set of all positive real numbers \mathbb{R}^+

Problem 2: Give an example of a function of each of the following types:
power function -
exponential function -
trigonometric function -

Problem 3: Draw, by hand, a rough sketch of the graph of the following functions:



Problem 4: Compute $(a + b)(a^2 - ab + b^2)$, where a and b are the roots of the equation $x^2 + 3x - 4 = 0$

Problem 5: Find the limits:

a) $\lim_{x \rightarrow -3} \frac{x^2 - 9}{x^2 + 2x - 3}$

b) $\lim_{x \rightarrow 1} e^{x^3 - x}$

c) $\lim_{x \rightarrow \infty} \frac{\sin(x)}{x}$

Problem 6: What does the 'squeeze' theorem says? (Provide the statement, or give a rough idea, or give an example of applying the theorem, or sketch by hand a picture illustrating the theorem)

Problem 7: Using Σ notation, rewrite the sum

$$3^2 + 4^2 + 5^2 + \cdots + 100^2 =$$

Expand the shorthand notation

$$\sum_{k=1}^n 2^k =$$

Problem 8: Write the derivatives of the following functions

a) $y = e^x$

c) $y = x^n$

b) $y = \ln(x)$

d) $y = \sin(x)$

Problem 9: Compute y' if $y = x^2(e^x + \ln(x))$.

Problem 10: If in a given interval the derivative of a function is positive, then the function is *increasing decreasing* in the interval. (cross out the WRONG word)