

Math 1071Q - Practice Exam for Midterm 1

These questions are for practice purpose, they do not reflect the actual format of the exam

- (1) Find the equation of the vertical line passing through the point $(3, -7)$. Draw the line.
- (2) Find the equation of the horizontal line passing through the point $(-1, -6)$. Draw the line.
- (3) Solve the equation $x^2 - 4x + 3 = 0$, then specify the intervals on which the function $f(x) = x^2 - 4x + 3$ takes positive and respectively negative values.

- (4) Find x for which the following quadratic function attains its maximum value, then find this maximum value:

$$f(x) = -x^2 + 7x - 6$$

Draw the graph of this function.

- (5) Determine the domain of $f(x)$. Give your answer using interval notation.

$$f(x) = \begin{cases} \frac{x+4}{x^2-14x+45} & 3 \leq x \leq 7 \\ 2x - 2 & x > 7 \end{cases}$$

- (6) Solve

$$4^{x^2-6} = \frac{1}{4^{5x}}$$

- (7) Solve

$$\frac{5^{2x^2}}{5^{3x}} = \frac{1}{5}$$

(8) Solve

$$3^{x^2+4} = \frac{1}{3^{4x}}$$

(9) You want to have \$100,000 in cash 10 years from now which you plan to invest in a startup business. If you find a saving account that pays annual interest of 3.7% compounded daily, then how much should you invest right now in the account in order to have the funds in 10 years? (Round your answer to the nearest cent)

(10) Solve the equation for x :

$$\log(x - 4) - \log(x - 3) = \log x$$

(11) Compute the following limits if they exist. If the limit does not exist, justify why the limit does not exist and write DNE:

(a)

$$\lim_{x \rightarrow 0} \frac{x^2 + 3x + 3}{x^2 + x}$$

(b)

$$\lim_{x \rightarrow 1} x^4 + x^2 + 3$$

(c)

$$\lim_{x \rightarrow -1} \frac{x + 1}{x^2 - 2x + 1}$$

(d)

$$\lim_{x \rightarrow -1} x^5 + x^2 - 1$$

(12) Let $f(x) = 2x^2 - 3$.

(a) Find the instantaneous rate of change at the point where $x = 1$

(b) Find the equation of the tangent line at the point where $x = 1$

- (13) Let $f(x) = 0.5x^3 + 5x - 10$.
- Find the average rate of change. on the interval $[2,4]$.
 - Find the y - intercept of the secant line through the point where $x = 2$ and the point where $x = 4$.
- (14) Graph the function $f(x) = -|x|$ and then graph the derivative of $f(x)$.
- (15) Find $f'(x)$ using the limit definition for the function

$$f(x) = \frac{1}{x+2}, x \neq -2$$