

Test #2

Problem 1: Check if the following lines have slopes, if they do then find them, if they don't then say why don't:

- $3y = 6x + 1$,
- $y = -2$

Problem 2: Find point-slope equations of the line:

- passing through $A = (-1, -3)$ and $B = (3, 2)$.
- with the slope $m = \frac{1}{2}$ passing through the point $C = (2, 1)$.

Problem 3: Find slope-intercept equation of the line which is orthogonal to $2x + y = 0$ and passes through the point $(2, 0)$.

Problem 4: What is the center and radius of the following circle:

$$x^2 + 6x + (y - 2)^2 = 7.$$

Problem 5: Determine if following equations are functions:

- $x - y = 0$,
- $y^2 + x^3 = 1$.

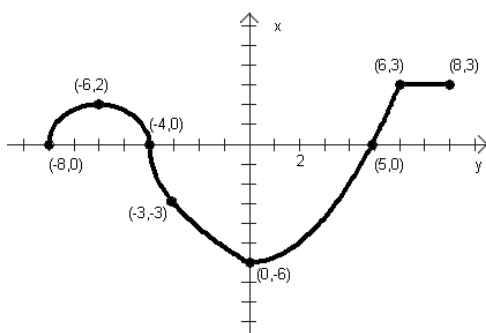
Problem 6: Find domain of the following function:

$$f(x) = \frac{3x + 4}{x^2 - 4}.$$

Problem 7: Consider $f(x) = 1 - 5x$.

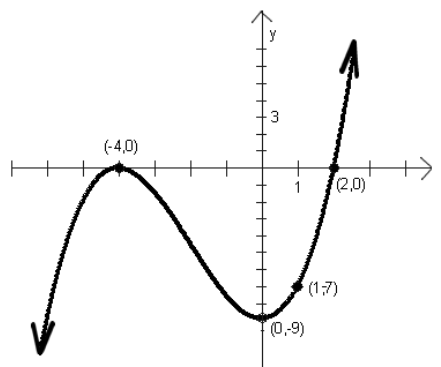
- Find $f(2)$,
- Find the difference quotient $\frac{f(x+h)-f(x)}{h}$.

Problem 8: Consider the following graph:



- Find $f(-3)$ and $f(6)$.
- For what numbers $f(x) = 0$?
- List intervals where $f(x) > 0$?
- What is the domain of this function?
- What is range of this function?
- List intervals where this function is constant.

Problem 9: Consider the following graph:



- Is this function decreasing on $[0, +\infty)$?
- Is this function decreasing on $[-4, 0]$?
- List local minima.
- List local maxima.

Problem 10: Graph the following function:

$$f(x) = \begin{cases} -1 & \text{if } x < -1, \\ x^3 & \text{if } -1 \leq x \leq 0, \\ \sqrt{x} & \text{if } x > 0. \end{cases}$$

Also, find $f(-4)$, $f(4)$ and intervals for which this function is increasing.

Problem 11: Graph $h(x) = -\frac{1}{x}$. Show each step of the transformation process.

Problem 12: Graph $g(x) = \sqrt{x-1} + 1$. Show each step of the transformation process.