



Bilkent University

Quiz # 04  
Math 101-Section 08 Calculus I  
4 November 2022 Friday  
Instructor: Ali Sinan Sertöz  
**Solution Key**

**Q-1)** Consider the function

$$f(x) = \frac{4x^2 + x + 100}{x}.$$

- (a) Find the asymptotes of the graph  $y = f(x)$ , if any.
- (b) Find  $f'$  and the critical points.
- (c) Find  $f''$ .
- (d) Prepare a table of the relevant values of  $f$ ,  $f'$ ,  $f''$  and show intervals of increase/decrease, concave up/down, etc
- (e) Sketch the graph of  $y = f(x)$ .

*Show your work in detail. Correct answers without detailed explanation do not get any credit.*

Grading: 2+2+1+3+2=10 points.

**Solution:**

(a)  $f(x) = 4x + 1 + \frac{100}{x}$ . There is a vertical asymptote at  $x = 0$ . Besides there is a slant asymptote  $y = 4x + 1$ .

(b)  $f'(x) = \frac{4(x^2 - 25)}{x^2} = 0$  when  $x = \pm 5$ .

(c)  $f''(x) = \frac{200}{x^3}$ .

(d)

	$\infty$	- 5	0	5	$\infty$
$f$	-	-		+	+
$f'$	+	-		-	+
$f''$	-	-		+	+
	↗	↘		↘	↗
	(	(		)	)

(e)

