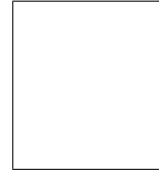




Quiz # 5
Math 101-Section 06 Calculus I
8 March, 2018, Thursday
Instructor: Ali Sinan Sertöz
Solution Key



Bilkent University

Name:

Department:

Student ID:

Q-1) Let $f(x) = \frac{x^2 + 1}{x^2 - 1}$.

- (i) Calculate, and simplify $f'(x)$.
- (ii) Calculate, and simplify $f''(x)$.
- (iii) On what intervals is f concave upward? Concave downward?

Answer:

(i)
$$f'(x) = \frac{-4x}{(x^2 - 1)^2}.$$

(ii)
$$f''(x) = 4 \frac{3x^4 - 2x^2 - 1}{(x^2 - 1)^4} = 4 \frac{(3x^2 + 1)(x^2 - 1)}{(x^2 - 1)^4} = 4 \frac{3x^2 + 1}{(x^2 - 1)^3}.$$

(iii)
 f is concave up on $(-\infty, -1)$ and on $(1, \infty)$.

And f is concave down on $(-1, 1)$.