

Sultan Qaboos University
College of Science
Department of Mathematics and Statistics
Math1106: Precalculus
Spring 2011

Assignment 2

Due Date: 18 & 19 April, 2011 during Lectures

Section

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| • <i>This assignment is a team work. One student can be a member of one team only.</i> |
| • <i>The number of students in a team is from 3 to 6.</i> |
| • <i>All team members will get the same grade - TEAM GRADE.</i> |
| • <i>Total marks is 50.</i> |
| • <i>Please staple the papers. Kindly answer all questions clearly and neatly.</i> |
| • <i>Do all questions and do not give more than one answer to a question.</i> |
| • <i>This assignment must be submitted to your instructor ON or BEFORE the due date</i> |
| • <i>Late submission will not be accepted.</i> |

Question	Mark
1	
2	
3	
4	
5	
Total	

Solve all questions and show all necessary work to get full credit. Simplify your answer as far as possible.

1. Let $P(x) = x^8 + 2x^7 - 2x^6 - 2x^5 - x^4 - 8x^3 + 10x^2 + 8x - 8$.

- (a) Use the Intermediate Value Theorem to show that P has a zero between $x = 0$ and $x = 2$.
- (b) Factor P completely and find all its zeros. State the multiplicity of each zero.
- (c) Sketch the graph of P , clearly showing all intercepts if any.

2. Let $r(x) = \frac{x^3 - 2x^2 - x + 2}{x^2 - x - 6}$.

- (a) Find all asymptotes of $r(x)$ if any and describe its end behavior.
- (b) Determine the behavior near vertical asymptotes.
- (c) Sketch the graph of r , clearly showing all intercepts and asymptotes.

3. Let $h(x) = \frac{3^x - 1}{3^{-x} - 1}$.

- (a) Find the domain of h . Write the answer in interval form.
- (b) Find $h^{-1}(-3)$ **without** computing the inverse function of h .
- (c) Find the inverse function of h and its domain and range.

4. Let $g(x) = \frac{\log_4(4 - x^2) + \log_4\left(x^2 + \frac{1}{4}\right)}{\log_4(x^2 - 1)}$.

- (a) Find the domain of g . Write the answer in interval form.
- (b) Find all real values of x such that $g(x) = 2$.

5. Solve the following inequalities for x and write the answer in interval form:

- (a) $e^{-x} + \frac{1}{e} > 0$
- (b) $x^{\ln x} \geq e^{-2}x^3$.