Assignment 1

Pages 22-24

19. If \( f(x) = 3x^2 - x + 2 \) find \( f(2) \), \( f(-2) \), \( f(a) \), \( f(-a) \), \( f(a+1) \), \( 2f(a) \), \( f(a^2) \), \([f(a)]^2\) and \( f(a+h) \).

21. If \( f(x) = x - x^2 \), find \( f(2+h) \), \( f(x+h) \), and \( \frac{f(x+h) - f(x)}{h} \) where \( h \) is not 0.

23 Find the domain and range of the following functions:

\[
f(x) = \frac{x}{3x+1} \quad \text{and} \quad f(x) = \frac{5x+4}{x^2 + 3x + 2}
\]

39 Find the domain, range and sketch the graph of the following function:

\[
f(x) = \begin{cases} x + 2 & \text{if } x \leq -1 \\ x^2 & \text{if } x > -1 \end{cases}
\]

Determine whether the following functions are even, odd or neither.

64. \( f(x) = x^4 - 4x^2 \) and 65. \( f(x) = x^3 - x \)

Page 47

31 Find \( f+g \), \( f-g \), \( fg \) and \( f/g \) and state their domains.

\[
f(x) = x^3 + 2x^2 \quad \text{and} \quad g(x) = 3x^2 - 1
\]

37. Find the functions \( f \circ g \) and \( g \circ f \) for the following functions.

\[
f(x) = \sin(x), \quad g(x) = 1 - \sqrt{x}
\]

Page 75

29 Find an explicit formula for \( f^{-1} \). Graph \( f \), \( f^{-1} \) and the line \( y = x \) on the same axes. What can you conclude about the graphs of \( f \) and \( f^{-1} \)?

\[
f(x) = 1 - \frac{2}{x^2}, \quad x > 0
\]
6. Give an example of each type of function:
   (a) linear, (b) exponential, (c) polynomial of degree 5, (d) power, (e) quadratic (f) rational

23. If \( f(x) = 2x + \ln(x) \), find \( f^{-1}(2) \).