Discrete Math	Section	01 or 02
	Student number	21900706
Homework 4	Name	조영관

*// Print this document and write solutions **by your hand**.*
// then scan your answer sheet and submit through LMS.
// Make sure that Copied answer will not be accepted.
// Use this format for your homework file name when you submit.
// format) Homework4_StudentNumber_Name.pdf ex) Homework4_2170011_KimHandong.pdf

Hw 4-1

Basis step : $p(2) = 2^3 - 2 = 6/3 = 2$ $p(n) = n^3 - n$ $\therefore$ $p(2)$ is true

Inductive step : $p(k+1) = (k+1)^3 - (k+1)$

$= (k^3 - k) + 3(k^2 + k)$

- $k^3 - k$ is divisible by 3 since it is $p(k)$
- $3(k^2+k)$ is divisible by 3 since it is an integer multiplied by 3

$\therefore$ $n^3 - n$ is divisible by 3, for n is all positive integer

Hw 4-2

Basis step : $p(1) = 2^0 = 1$ $\therefore$ $p(1)$ is true

Inductive step

$k+1$ is even

$\frac{k+1}{2}$ is integer and sum of distinct powers of two $(2^{a_0} + 2^{a_1} + 2^{a_2} \dots 2^{a_j})$

$k+1$ is $2(2^{a_0} + 2^{a_1} \dots 2^{a_j})$ which is also distinct

$k+1$ is odd

k is even

k is sum of distinct powers of two

since k is even, 2^0 does not exist

Adding 2^0 becomes $k+1$ which is still a distinct powers of two

$\therefore$ All $p(n)$ where $1 \le n \le k$ $p(k+1)$ is true