## HW-5.2-5.3

1. (40 points) Consider the following statement denoted by P(n) where  $n \ge 2$  is an integer.

$$P(n) : 5 \mid (7^n - 2^n)$$

a) (8 points) State and prove the basis step.

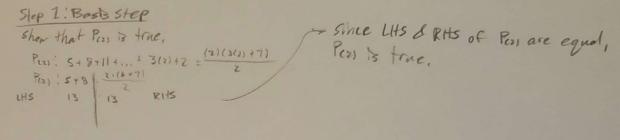
b) (7 points) Write the statements that correspond to P(k) & P(k + 1).

c) (25 *points*) Prove that P(n) is true for all integers  $n \ge 2$  using the Principle of Mathematical Induction by writing and completing the inductive step.

2. (30 points) Consider the following statement denoted by P(n) where  $n \ge 2$  is an integer.

$$P(n):$$
 5+8+11+...+  $(3n+2) = \frac{n(3n+7)}{2}$ 

a) (8 points) State and prove the basis step.



b) (7 points) Write the equations that correspond to P(k) & P(k+1).

c) (15 *points*) Prove that P(n) is true for all integers  $n \ge 2$  using the Principle of Mathematical Induction by writing and completing the inductive step.

Since Uts of PCKHI) = RHS of PCKHI),
PCKHI) is true.
This completes the industive step.
Thus PCHI is true & 1228 n & Z.