Math 2534 Solution Homework 6 Spring 2018

Put all work on another sheet of paper: Follow Homework requirements.

Problem 1: Using the Quotient Remainder Theorem find the following:
If $a \bmod 6 = 2$ and $b \bmod 6 = 5$, find (a+b)mod 6

Solution:

$Given: a \bmod 6 = 2$ and $b \bmod 6 = 5$, we have that $a = 6q + 2, b = 6k + 5$ by the QRT for integers q and k. now consider

$a + b = (6q + 2) + (6k + 5) = 6q + 6k + 7 = 6m + 1$, where m = q+k+1 is an integer.

Therefore $(a + b) \bmod 6 = 1$

Problem 2: According to the Quotient Remainder Theorem how are the integers partitioned by Zmod 6. Zmod 6 is partitioned into $[0], [1], [2], [3], [4], [5]$.

Where n = 6q+ 0, n = 6q + 1, n = 6q + 2, n = 6q + 3, n = 6q + 4 or n = 6q + 5

Problem 3: Find the value of $\sum_{i=1}^{n+2} (-1)^i (2^i)$ when n = 3.

Solution: $\sum_{i=1}^{5} (-1)^i (2^i) = (-2) + (4) + (-8) + (16) + (-32) = -22$

Problem 4: Given the recursive sequence $a_1 = 3,\ a_2 = 5,\ a_n = a_{n-1} + a_{n-2}$, n > 1, find the first six terms in this sequence.

$a_1 = 3, a_2 = 5$

$a_3 = a_2 + a_1 = 5 + 3 = 8$

$a_4 = a_3 + a_2 = 8 + 5 = 13$

$a_5 = a_4 + a_3 = 13 + 8 = 21$

$a_6 = a_5 + a_4 = 21 + 13 = 34$

Problem 5: If you are given a sequence function $f(x) = e^{n-1}$, find the recursive sequence that will give you the same results. Recursive sequence: $a_1 = 1,\ a_n = ea_{n-1},\ n > 1$

Problem 6: Reduce the following factorials.

a) $\frac{(n+1)!}{(n-2)!} = (n-1)(n)(n+1)$ b) $\frac{(n-2)!}{(n+5)!} = \frac{1}{(n-1)(n)(n+1)(n+2)(n+3)(n+4)(n+5)}$