Discrete Mathematics (2016 Spring) Midterm I solution

2.
$$p \to (q \lor \neg p) = \neg p \lor (q \lor \neg p) = \neg p \lor q = \neg (p \land \neg q)$$

解法1 3.

$$[(p \to q) \land (\neg r \lor s) \land (p \lor r)] \to (\neg q \to s).$$

Steps

Reasons

1)
$$\neg(\neg q \rightarrow s)$$

2)
$$\neg q \wedge \neg s$$

4)
$$\neg r \lor s$$

6)
$$p \rightarrow q$$

9)
$$p \vee r$$

12)
$$\therefore \neg q \to s$$

5.
$$(x+1)^n = c_0^n x^0 + c_1^n x^1 + c_2^n x^2 - c_n^n x^n$$
 $(x+1)^n = c_0^n x^0 + c_1^n x^1 + c_2^n x^2 - c_n^n x^n$
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 $(x+1)^n = c_0^n x^0 + c_1^n x^1 + c_2^n x^2 - c_n^n x^n$
 $(x+1)^{n-1} = c_0^n x^0 + c_1^n x^1 + c_2^n x^2 - c_n^n x^n$
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 $(x+1)^{n-1} = c_0^n x^0 + c_1^n x^1 + c_2^n x^2 - c_1^n x^1 + c_2^n x^1 + c_2$

解 2.

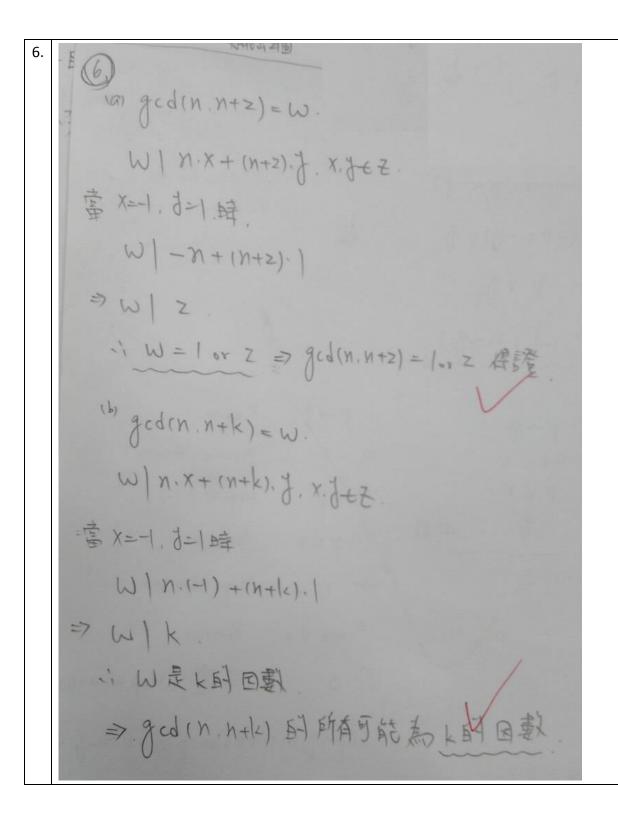
Since the

#IJ. For summands at
$$k=0$$
 & $k=1$ are zero, we could rewrite the

LHS as $\sum_{k=2}^{n} k(k-1) \binom{n}{k}$.

$$= \sum_{k=2}^{n} k(k-1) \frac{n!}{k!(n-k)!} = \sum_{k=2}^{n} \frac{n!}{(k-2)!(n-k)!} = n(n-1) \sum_{k=2}^{n} \frac{(n-2)!}{(k-2)!(n-k)!}$$

$$= n(n-1) \sum_{k=2}^{n} \binom{n-2}{k-2} = n(n-1) 2^{n-2}$$



7. (1)
$$N=64$$
. $\Rightarrow 64=5\times 6+17\times 2$. $N=65\Rightarrow .65=5\times 13$. $N=66\Rightarrow .66=5\times 3+17\times 3$. $N=67\Rightarrow .69=5\times (0+19)$. $N=68\Rightarrow .68=17\times 4$. $N=69\Rightarrow .69=(69-5)+5$. $N=69\Rightarrow .69$

8. (a)
$$\frac{5!}{2! \cdot 1! \cdot 2!} \cdot (z)^{2} \cdot (-1) \cdot (3)^{2} = \frac{120}{4! \cdot (-1)} \cdot 9$$

(b) $H^{\frac{4}{5}} = C^{\frac{8}{5}} = \frac{8 \cdot 7 \cdot 6}{6} = \frac{120}{6} \cdot \frac{1}{12} \cdot \frac{1}{12}$

(a) 人(-1)、3、4 = -2880 Total: 240 + (440-2880. = 240 - 1440 = -1200 * (b) 人(a) 在(d) 小題、因為多了 x か了才頂、因此在 所有时可能中、富义的次示介於 245 实現 可以進行 会併、所以總項 最會 歌竹、 原手的 (b) 小題、 才不能和 x 合併、 故.總項 歌奏