Review

$\longrightarrow \big(M(J) \to F(J) \big)$

1.	$(\forall x)\big(M(x) \to I(x) \vee G(x)\big)$	hyp
2.	$(\forall x)\big(G(x) \wedge L(x) \to F(x)\big)$	"
3.	$I(J)'$	"
4.	$L(J)$	"
5.	$M(J) \to \big(I(J) \vee G(J)\big)$	1, ui
6.	$G(J) \wedge L(J) \to F(J)$	2, ui
7.	$M(J)$	ded. method
8.	$I(J) \vee G(J)$	5, 7, mp
9.	$G(J)$	3, 8, ds
10.	$G(J) \wedge L(J)$	4, 9, conj
11.	$F(J)$	6, 10, mp

#3 $\underbrace{1 \cdot 2^1 + 2 \cdot 2^2 + \dots + n\,2^n = (n-1)\,2^{n+1} + 2}_{P(n):}$

Base case: $n=1$

LHS: $1 \cdot 2^1 = 2$ RHS: $(1-1)2^{1+1} + 2 = 2$ ✓

Inductive Step: $P(k) \to P(k+1)$

$P(k)$: $\underbrace{1 \cdot 2^1 + \dots + k2^k}$ $= (k-1)2^{k+1} + 2$

$P(k+1)$: $+ (k+1)2^{k+1} = ((k+1)-1)2^{(k+1)+1} + 2$

$= k \cdot 2^{k+2} + 2$

Assume $P(k)$ & consider the LHS of $P(k+1)$:

$\underbrace{1 \cdot 2^1 + \dots + k2^k}_{(k-1)2^{k+1}+2}$ $+ (k+1)2^{k+1} = (k-1)2^{k+1} + 2 + (k+1)2^{k+1}$

(by $P(k)$)

$= k2^{k+1} - 2^{k+1} + 2 + k2^{k+1} + 2^{k+1}$

$= 2k2^{k+1} + 2$

$= k2^{k+2} + 2$ ✓

1b. $P \wedge P' \to Q$

1.	P	hyp
2.	P'	hyp
3.	$P \vee Q$	1, add
4.	Q	2, 3, ds