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1.1 s lparen -> s mparen

By rule induction on the judgment s lparen.

case $\frac{}{\epsilon\ lparen} Leps$ where $s = \epsilon$

$\epsilon\ mparen$	by rule $Meps$

case $\frac{s_1\ lparen \quad s_2\ lparen}{(s_1)\ s_2\ lparen} Lseq$ where $s = (s_1)\ s_2$

$s_1\ mparen$	induction hypothesis on $s_1\ lparen$
$s_2\ mparen$	induction hypothesis on $s_2\ lparen$
$(s_1) mparen$	by the rule Mpar
$(s_1) s_2\ mparen$	by the rule Mseq

1.2 $s\ tparen$ and $s'\ tparen$ -> $ss'\ tparen$
<-> if $s'\ tparen$, $s\ tparen$ implies $ss'\ tparen$

By rule induction on the judgment $s'\ tparen$

case $\frac{}{\epsilon\ tparen} Teps$ where $s' = \epsilon$

$s\ tparen$	assumption
$ss' = s\epsilon = s$	by definition of epsilon
$ss'\ tparen$	by assumption

case $\frac{s_1\ tparen \quad s_2\ tparen}{s_1\ (s_2)\ tparen} Tseq$ where $s' = s_1\ (s_2)$

$s\ tparen$	assumption
$s\ tparen$ implies $s\ \ s_1\ tparen$	induction hypothesis on $s_1\ tparen$
$s\ \ s_1\ tparen$	from assumption
$ss' = s s_1 (s_2)$	assumption
$s\ s_1 (s_2)\ tparen$	by rule Tseq (s1 = s s1, s2 = s2)

1.3 s mparen -> s tparen

By rule induction on the judgment $s\ \ mparen$

case $\dfrac{}{\epsilon\ \ mparen}Meps$ where $s = \epsilon$

$\epsilon\ \ tparen$	by Rule Teps

case $\dfrac{s'\ mparen}{(s')\ \ mparen}Mpar$ where $s = (s')$

$s'\ \ tparen$	induction hypothesis on $s'\ \ mparen$
$\epsilon\ \ tparen$	by Rule Teps
$(s')\ \ tparen$	by Rule Tseq (s1=e, s2=s') and e(s2) = (s2)

case $\dfrac{s_1\ \ mparen \quad s_2\ \ mparen}{s_1\ \ s_2\ \ mparen}Mseq$ where $s = s_1\ \ s_2$

$s_1\ \ tparen$	induction hypothesis on $s_1\ \ mparen$
$s_2\ \ tparen$	induction hypothesis on $s_2\ \ mparen$
$s_1 s_2\ \ tparen$	by lemma 1.2