```
mod_add  THM

⊢  ∀x,y:ℤ, n:ℕ+ . ((x+y) mod n) = (((x mod n)+(y mod n)) mod n)
| by ((Auto
|      THEN
|      (Inst
|       Thm* ∀a:ℤ, n:ℕ+ . a = (a ÷↓ n)·n+(a mod n) & (a mod n)<n
|       {div_floor_mod_properties}
|       [x;n]))
|     THEN
|     (Inst
|      Thm* ∀a:ℤ, n:ℕ+ . a = (a ÷↓ n)·n+(a mod n) & (a mod n)<n
|      {div_floor_mod_properties}
|      [y;n])
|     THEN
|     (Inst
|      Thm* ∀a:ℤ, n:ℕ+ . a = (a ÷↓ n)·n+(a mod n) & (a mod n)<n
|      {div_floor_mod_properties}
|      [(x mod n)+(y mod n);n]))
|    THEN
|    RepDHyps
|
1. x : ℤ
2. y : ℤ
3. n : ℕ+
4. x = (x ÷↓ n)·n+(x mod n)
5. (x mod n)<n
6. y = (y ÷↓ n)·n+(y mod n)
7. (y mod n)<n
8. (x mod n)+(y mod n)
   =
   (((x mod n)+(y mod n)) ÷↓ n)·n+(((x mod n)+(y mod n)) mod n)
9. (((x mod n)+(y mod n)) mod n)<n
⊢  ((x+y) mod n) = (((x mod n)+(y mod n)) mod n)
  by Inst
     Thm* ∀a:ℤ, n:ℕ+, q:ℤ, r:ℕ.
          a = q·n+r ⇒ r<n ⇒ q = (a ÷↓ n) & r = (a mod n)
     {div_floor_mod_unique}
     [x+y
     ;n
     ;(x ÷↓ n)+(y ÷↓ n)+(((x mod n)+(y mod n)) ÷↓ n)
     ;((x mod n)+(y mod n)) mod n]
END
```