```
demorgan2  THM

⊢  Dec(P) ⇒ Dec(Q) ⇒ (¬(P & Q) ⟺ ¬P ∨ ¬Q)  by GenUnivCD
|
1. P : Prop
2. Q : Prop
3. Dec(P)
4. Dec(Q)
⊢  ¬(P & Q) ⟺ ¬P ∨ ¬Q  by UnfoldTopAb 3 THEN UnfoldTopAb 4
|
3. P ∨ ¬P
4. Q ∨ ¬Q
⊢  ¬(P & Q) ⟺ ¬P ∨ ¬Q  by Analyze 3 THEN Analyze 4
|
|\
| 3. P
| 4. Q
| 5. ¬(P & Q)
| ⊢  ¬P ∨ ¬Q  by Analyze 5
|
|\
| 3. P
| 4. Q
| 5. ¬P ∨ ¬Q
| ⊢  ¬(P & Q)  by Analyze 5 THEN Analyze 5
|
|\
| 3. P
| 4. ¬Q
| 5. ¬(P & Q)
| ⊢  ¬P ∨ ¬Q  by DNth 2 0
|
|\
| 3. P
| 4. ¬Q
| 5. ¬P ∨ ¬Q
| ⊢  ¬(P & Q)  by Analyze 0
| |
| 6. P & Q
| ⊢  False  by Analyze -1
| |
| 6. P
| 7. Q
| ⊢  False  by UnfoldTopAb 4 THEN RenameVar ‘x’ 7 THEN Witness4 x
|
|\
| 3. ¬P
| 4. Q
| 5. ¬(P & Q)
| ⊢  ¬P ∨ ¬Q  by DNth 1 0
|
|\
| 3. ¬P
| 4. Q
| 5. ¬P ∨ ¬Q
```

```
| ⊢  ¬(P & Q)  by Analyze 0 THEN Analyze -1
| |
| 6. P
| 7. Q
| ⊢  False  by RenameVar ‘x’ 6 THEN Witness3 x
|
|\
| 3. ¬P
| 4. ¬Q
| 5. ¬(P & Q)
| ⊢  ¬P ∨ ¬Q  by DNth 1 0
|
.\
. 3. ¬P
. 4. ¬Q
. 5. ¬P ∨ ¬Q
. ⊢  ¬(P & Q)  by Analyze 0 THEN Analyze -1
. |
. 6. P
. 7. Q
. ⊢  False  by RenameVar ‘x’ -1 THEN Witness4 x
END
```