```
coprime_iff_ndivides  THM

⊢  ∀a,p:ℤ. prime(p) ⇒ (CoPrime(p,a) ⟺ ¬p ∣ a)  by GenRepD
|
|\
| 1. a : ℤ
| 2. p : ℤ
| 3. prime(p)
| 4. CoPrime(p,a)
| ⊢  ¬p ∣ a
| | by (RWO
| |     Thm* ∀a,b:ℤ. CoPrime(a,b) ⟺ (∀c:ℤ. c ∣ a ⇒ c ∣ b ⇒ (c ∼ 1))
| |     {coprime_elim}
| |     4)
| |    THEN
| |    (Analyze 0)
| |
| 4. ∀c:ℤ. c ∣ p ⇒ c ∣ a ⇒ (c ∼ 1)
| 5. p ∣ a
| ⊢  False  by Unfold ‘prime‘ 3 THEN RepD
| |
| 3. ¬p = 0
| 4. ¬(p ∼ 1)
| 5. ∀b,c:ℤ. p ∣ b•c ⇒ p ∣ b ∨ p ∣ c
| 6. ∀c:ℤ. c ∣ p ⇒ c ∣ a ⇒ (c ∼ 1)
| 7. p ∣ a
| ⊢  False  by FwdThru 6 [7]
| |
| |\
| | .....antecedent .....
| | ⊢  p ∣ p  by RelRST
| |
| .\
| . 8. p ∼ 1
| . ⊢  False  by Trivial
|
.\
. 1. a : ℤ
. 2. p : ℤ
. 3. prime(p)
. 4. ¬p ∣ a
. ⊢  CoPrime(p,a)
. | by (BackThru
. |     Thm* ∀a,b:ℤ. (∀c:ℤ. c ∣ a ⇒ c ∣ b ⇒ c ∣ 1) ⇒ CoPrime(a,b)
. |     {coprime_intro})
. |    THEN
. |    RepD
. |
. 5. c : ℤ
. 6. c ∣ p
. 7. c ∣ a
. ⊢  c ∣ 1
. | by (Simple
. |     (FwdThru
. |      Thm* ∀p:ℤ.
```

```
. |           prime(p)
. |           ⇒
. |           ¬p = 0 & ¬(p ∼ 1) & (∀a:ℤ. a ∣ p ⇒ (a ∼ 1) ∨ (a ∼ p))
. |      {prime_elim}
. |      [3]))
. |    THEN
. |    RepD
. |
. 8. ¬p = 0
. 9. ¬(p ∼ 1)
. 10. ∀a:ℤ. a ∣ p ⇒ (a ∼ 1) ∨ (a ∼ p)
. ⊢  c ∣ 1  by FwdThru 10 [6]
. |
. 11. (c ∼ 1) ∨ (c ∼ p)
. ⊢  c ∣ 1  by (Unfold ‘assoced‘ 11) THEN GenExRepD
. |
. |\
. | 11. c ∣ 1
. | 12. 1 ∣ c
. | ⊢  c ∣ 1  by Trivial
. |
. .\
. . 11. c ∣ p
. . 12. p ∣ c
. . ⊢  c ∣ 1  by RelRST
END
```