

Venn Diagrams and PPL

October 15, 2013

1. Simplify each of the wffs as much as possible. You may use the rules on your handout for guidance.

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|--|---|
| (a) $\sim\forall\sim(F^1 \& \sim G^1)$ | (e) $\forall\sim F^1 \supset \exists(\sim G^1 \& \sim H^1)$ |
| (b) $\sim\exists\sim(F^1 \supset \sim G^1)$ | (f) $\forall(F^1 \supset \sim F^1) \vee \sim F^1 a$ |
| (c) $\sim(\exists\sim(F^1 \supset G^1) \vee \exists(F^1 \& \sim G^1))$ | (g) $\exists\sim((F^1 \& G^1) \& H^1) \supset$
$((F^1 a \& \sim G^1 a) \vee (F^1 a \& H^1 a))$ |
| (d) $\sim(\exists(F^1 \& H^1) \vee \exists(\sim F^1 \& G^1))$ | |

2. Draw a Venn diagram for each wff.

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|---|---|
| (a) $\forall(\sim F^1 \supset G^1)$ | (e) $\forall(F^1 \supset (G^1 \supset H^1))$ |
| (b) $\exists(\sim F^1 \& G^1)$ | (f) $\exists(F^1 \& \sim G^1) \& \forall(G^1 \supset \sim H^1)$ |
| (c) $\forall((F^1 \& G^1) \supset H^1)$ | (g) $\exists(F^1 \& G^1) \& (F^1 \& \sim G^1) a$ |
| (d) $\exists(F^1 \& (G^1 \vee \sim H^1))$ | (h) $\forall(F^1 \supset G^1) \& (F^1 a \& \sim G^1 b)$ |

3. Show with Venn diagrams that the following sets of wffs are consistent.

- (a) $\{\forall(F^1 \supset G^1), \sim\exists F^1\}$
(b) $\{\exists F^1, \exists G^1, \sim\exists(F^1 \& G^1)\}$
(c) $\{\forall F^1 \supset \forall G^1, \sim\forall(F^1 \supset G^1)\}$
(d) $\{\forall F^1 \vee \forall G^1, \sim(\exists\sim F^1 \leftrightarrow \forall G^1)\}$
(e) $\{\forall((F^1 \& G^1) \supset H^1), \sim\forall(F^1 \supset (H^1 \& G^1)), \sim\forall(G^1 \supset (F^1 \& H^1))\}$
(f) $\{\exists(F^1 \leftrightarrow G^1), \sim\forall(F^1 \supset G^1), \sim\forall(G^1 \supset H^1)\}$