From the book, pg. 40:
Derived Rule for Indirect Proofs R.A.A.: *If a contradiction is derivable from a set of premises and the negation of a formula S, then S is derivable from the set of premises alone.*
In other words, to use this rule to make a conclusion C, we ...

1. Introduce $\neg C$ as a premise,
2. Use that premise to derive a contradiction $P \wedge \neg P$ (for any sentence P that you can find),
3. Reject $\neg C$ as valid (it led to a contradiction), and hence
4. Conclude C

From the text, pg. 42:
"If a declaration of war is a sound strategy, then either fifty divisions are poised at the border or twenty wings of long-range bombers are ready to strike. However, fifty divisions are not poised at the border. Therefore, if twenty wings of long-range bombers are not ready to strike, then either a declaration of war is not a sound strategy or new secret weapons are available."

Let

$D =$ "A declaration of war is a sound strategy."
$F =$ "Fifty divisions are poised at the border."
$T =$ "Twenty wings of long-range bombers are ready to strike."
$S =$ "New secret weapons are available."

The argument has the following premises:

$\{1\}$	(1) $D \to F \vee T$	Premise
$\{2\}$	(2) $\neg F$	Premise

and wants to conclude the sentence $\neg T \to (\neg D \vee S)$. We will introduce the negation of the conclusion and then derive a contradiction from it and premises alone. In trying to do that, I will introduce the premise D on line (8) and use reductio ad absurdum to conclude $\neg D$ and use that sentence to make the final application of reductio ad absurdum in line (15).

$\{1\}$	(1) $D \to F \vee T$	Premise
$\{2\}$	(2) $\neg F$	Premise
$\{3\}$	(3) $\neg(\neg T \to \neg D \vee S)$	Premise
$\{3\}$	(4) $\neg T \wedge \neg(\neg D \vee S)$	3 T Law of Negation for Implication
$\{3\}$	(5) $\neg T$	4 T Law of Simplification
$\{3\}$	(6) $\neg(\neg D \vee S) \wedge \neg T$	4 T Commutative law for $\wedge$
$\{3\}$	(7) $\neg(\neg D \vee S)$	6 T Law of Simplification
$\{8\}$	(8) D	Premise
$\{1, 8\}$	(9) $F \vee T$	1, 8 T Law of Detachment
$\{1, 2, 8\}$	(10) T	2, 9 T Modus tollendo ponens
$\{1, 2, 3, 8\}$	(11) $T \wedge \neg T$	5, 10 T Law of Adjunction
$\{1, 2, 3\}$	(12) $\neg D$	8, 11 R.A.A.
$\{1, 2, 3\}$	(13) $\neg D \vee S$	12 T Law of Addition
$\{1, 2, 3\}$	(14) $\neg(\neg D \vee S) \wedge (\neg D \vee S)$	7, 13 T Law of Adjunction
$\{1, 2\}$	(15) $\neg T \to \neg D \vee S$	3, 14 T R.A.A.

#8(a) from Exam 1 (via reductio ad absurdum): We are trying to conclude $\neg P$ from premises (1) and (2). We will do so by admitting $\neg(\neg P)$ as a premise and deriving a contradiction, and then applying **R.A.A.** to conclude $\neg P$.

$\{1\}$	(1) $P \to Q$	Premise
$\{2\}$	(2) $\neg Q$	Premise
$\{3\}$	(3) $\neg(\neg P)$	Premise
$\{3\}$	(4) P	3 T (Law of Double Negation)
$\{1,3\}$	(5) Q	4 T (Law of Detachment)
$\{1,2,3\}$	(6) $Q \wedge \neg Q$	2, 5 T (Law of Adjunction)
$\{1,2,\}$	(7) $\neg P$	3, 6 T R.A.A.

#8(b) from Exam 1 (via reductio ad absurdum): We are trying to prove S from using premises (1) through (4). We will do so by admitting $\neg S$ as a premise and deriving a contraction, and then applying **R.A.A.** to conclude S.

$\{1\}$	(1) $P \to Q$	Premise
$\{2\}$	(2) $Q \to R$	Premise
$\{3\}$	(3) $S \vee (\neg R)$	Premise
$\{4\}$	(4) P	Premise
$\{5\}$	(5) $\neg S$	Premise
$\{3\}$	(6) $(\neg R) \vee S$	3 T (Commutativity of $\vee$)
$\{3\}$	(7) $R \to S$	6 T (Law of Equivalence of Implication and Disjunction)
$\{3\}$	(8) $\neg S \to \neg R$	7 T (Law of Contraposition)
$\{3,5\}$	(9) $\neg R$	5, 8 T (Law of Detachment)
$\{1\}$	(10) $\neg Q \to \neg P$	1 T (Law of Contraposition)
$\{2\}$	(11) $\neg R \to \neg Q$	2 T (Law of Contraposition)
$\{2,3,5\}$	(12) $\neg Q$	9, 11 T (Law of Detachment)
$\{1,2,3,5\}$	(13) $\neg P$	10, 12 T (Law of Detachment)
$\{1,2,3,4,5\}$	(14) $P \wedge (\neg P)$	4, 13 T (Law of Adjunction)
$\{1,2,3,4\}$	(15) S	5, 14 T R.A.A.