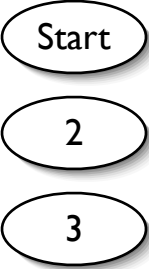
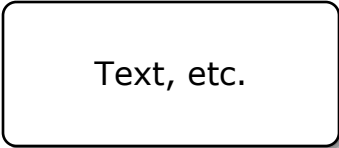
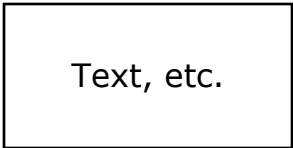
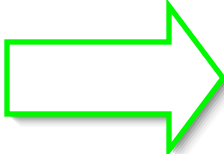
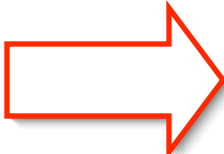
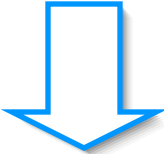




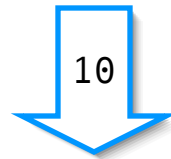
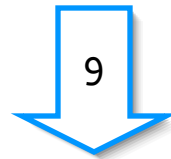
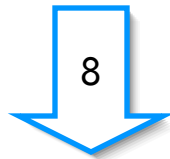
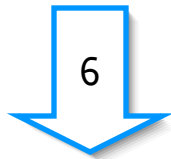
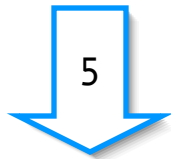
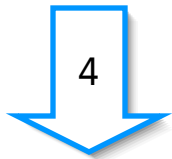
Legend:

State markers:	
Main user visible content and interface:	
Auxiliary user visible content and interface:	
Correct move:	
Incorrect move:	
Navigational move:	
Feedback content:	
Hint content:	

Start

Complete the following derivation by filling in the missing formulae. To fill in the formula on a given line, just click anywhere on that line.

1.	A & B	Premise
2.	C v D	Premise
3.	C	Assum
4.	?	&ER: 1
5.	?	&I: 4,3
6.	?	vIR: 5
7.	D	Assum
8.	?	&EL: 1
9.	?	&I: 7,8
10.	?	vIL: 9
11.	(B & C) v (D & A)	vE: 2,6,10



2

3

4

5

6

7

Completed Derivation:

1.	A & B	Premise
2.	C v D	Premise
3.	C	Assum
4.	B	&ER: 1
5.	B & C	&I: 4,3
6.	(B & C) v (D & A)	vIR: 5
7.	D	Assum
8.	A	&EL: 1
9.	D & A	&I: 7,8
10.	(B & C) v (D & A)	vIL: 9
11.	(B & C) v (D & A)	vE: 2,6,10

Interface for entering formulae:

Enter the formula that should appear on line n of the derivation using the buttons below:

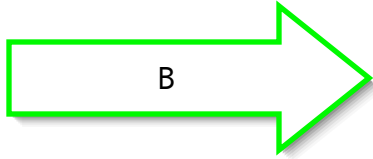
A	B	C	D
&	\vee	\rightarrow	\neg
	()	

Submit

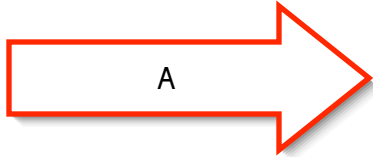
Hint

I've included the ideal version of the interface, here, which contains all and only those symbols actually appearing in the exercise.

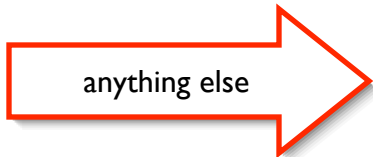
If a standardized palette is going to be used for all exercises (for a given set of connectives), I'd prefer to use different sentential letters than those above. Please let me know if that's the case so that I can make the appropriate changes to the scripts.



That's right.




A is the left-hand conjunct of the formula on line 1, not the right-hand one.



By applying &E rule to a conjunction, the only formulae that can be derived are the two conjuncts. The variant of the rule determines which conjunct.



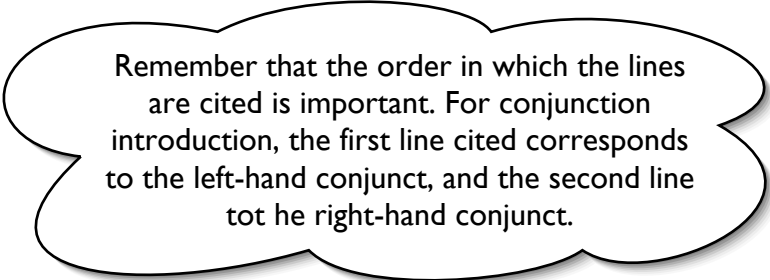
B & C



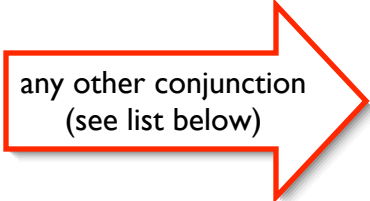
That's right.



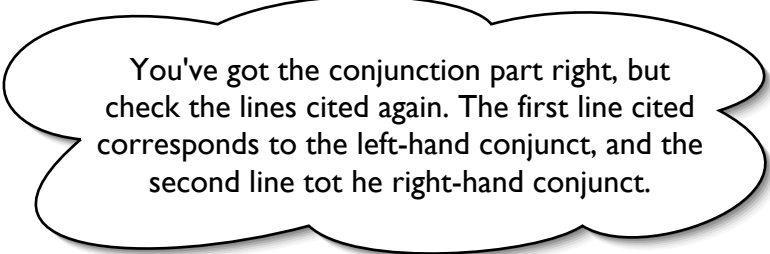
C & B



Remember that the order in which the lines are cited is important. For conjunction introduction, the first line cited corresponds to the left-hand conjunct, and the second line to the right-hand conjunct.



any other conjunction
(see list below)

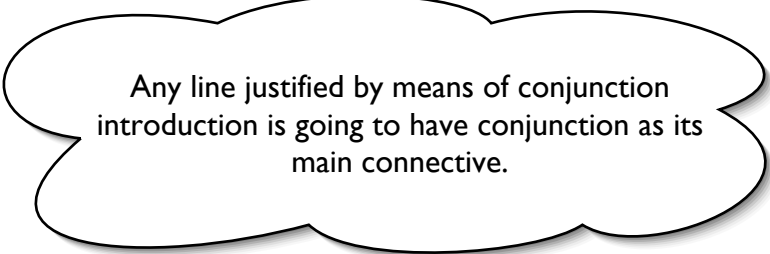


You've got the conjunction part right, but check the lines cited again. The first line cited corresponds to the left-hand conjunct, and the second line to the right-hand conjunct.

A & B
B & A
A & C
C & A
A & D
D & A
B & D
D & B
C & D
D & C



anything else



Any line justified by means of conjunction introduction is going to have conjunction as its main connective.



$(B \ \& \ C) \vee (D \ \& \ A)$

That's right.



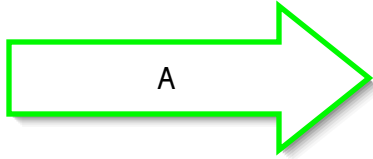
$(D \ \& \ A) \vee (B \ \& \ C)$

You have the main connective and the added disjunct right, but you've put the disjuncts in the wrong order. The new disjunct goes on the right when \vee IR is used.

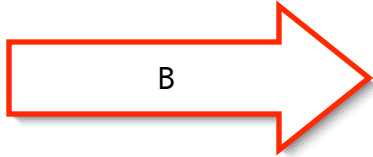


anything else

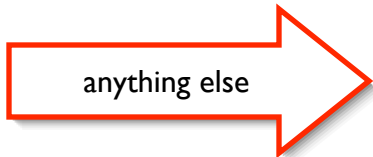
Try looking at later lines in the derivation to see if this line is cited in their justification. Recall that some rules are used to derive the same formula as on one or more lines cited.



That's right.



B is the left-hand conjunct of the formula on line 1, not the right-hand one.



By applying &E rule to a conjunction, the only formulae that can be derived are the two conjuncts. The variant of the rule determines which conjunct.

D & A

That's right.

A & D

Remember that the order in which the lines are cited is important. For conjunction introduction, the first line cited corresponds to the left-hand conjunct, and the second line to the right-hand conjunct.

any other conjunction
(see list below)

You've got the conjunction part right, but check the lines cited again. The first line cited corresponds to the left-hand conjunct, and the second line to the right-hand conjunct.

A & B
B & A
A & C
C & A
A & D
D & A
B & D
D & B
C & D
D & C

anything else

Any line justified by means of conjunction introduction is going to have conjunction as its main connective.

7

$(B \ \& \ C) \vee (D \ \& \ A)$

That's right.

$(D \ \& \ A) \vee (B \ \& \ C)$

You have the main connective and the added disjunct right, but you've put the disjuncts in the wrong order. The new disjunct goes on the left when $\vee I L$ is used.

anything else

Try looking at later lines in the derivation to see if this line is cited in their justification. Recall that some rules are used to derive the same formula as on one or more lines cited.

Hints

Each hint should contain the following, after specific hint content:

Click [here to view the introduction rules](#), and [here to view the elimination rules](#).

The links should be to the following files, as indicated by both order and colour:

[missingformulaehintintrorules.gif](#)
[missingformulaehintelimrules.gif](#)

2

Remember that applying $\&E$ R to a conjunction results in the right-hand conjunct being derived.

The formula on line 1, to which $\&E$ R is being applied, is $A \ \& \ B$, so it is the right-hand conjunct of this formula that you need to enter.

The right-hand conjunct of $A \ \& \ B$ is B .

3

Remember that applying $\&I$ to two lines result in a conjunction being derived.

The formula on lines 4 and 3, to which $\&I$ is being applied, are B and C , respectively, so it is the conjunction of these two formulae (in that order) that you need to enter.

The conjunction of B and C is $B \ \& \ C$.

4, 7

If you can't tell what formula to add as the right-hand disjunct here, check the formula on line 11 for a clue.

Since disjunction elimination requires the formula on the last line of each subderivation to be the same as the formula derived, by looking at the formula on line 11, you can tell what this formula must be.

The formula on line 11 must be the same as this formula, so you need to enter $(B \ \& \ C) \ \vee \ (D \ \& \ A)$.

5

Remember that applying $\&E$ L to a conjunction results in the left-hand conjunct being derived.

The formula on line 1, to which $\&E$ L is being applied, is $A \& B$, so it is the left-hand conjunct of this formula that you need to enter.

The left-hand conjunct of $A \& B$ is A .

6

Remember that applying $\&I$ to two lines result in a conjunction being derived.

The formula on lines 7 and 8, to which $\&I$ is being applied, are D and A , respectively, so it is the conjunction of these two formulae (in that order) that you need to enter.

The conjunction of D and A is $D \& A$.