1. (2pts) Decide (with reasons) if this a valid arguments:

   If people are crazy (C), then they should be in an asylum (A). I am in an asylum. Therefore I am crazy.

   $C \rightarrow A$

   A

   Good

   It is not valid, if they gave you C you could get A but not the other way around. You could be in an asylum & not be crazy, you could work there.

2. (4pts) Use a proof sequence to show that this argument is valid:

1. (2pts) Decide (with reasons) if this a valid arguments:

If people are crazy, then they should be in an asylum. I am in an asylum. Therefore I am crazy.

The argument is not valid.

While crazy people should be in an asylum, being in an asylum does not imply craziness.

You could just be the janitor at the asylum!

And the janitor isn't crazy,

Unless he is...

1. (2pts) Decide (with reasons) if this a valid arguments:

If people are crazy, then they should be in an asylum. I am in an asylum. Therefore I am crazy.

C A

$(C \to A) \wedge A$

careful!

This cannot be proven true. The statement $C \to A$ can still be true if A is true and C is false. Therefore, A being true doesn't say anything meaningful about C.

Well done!

1. (2pts) Decide (with reasons) if this a valid arguments:

If people are crazy, then they should be in an asylum. I am in an asylum. Therefore I am crazy.

1. $C \to A$ hyp
2. A hyp
3. C Not valid

This is not logically valid, as the consequent of the implication being true does not say anything about the antecedent.

Good!

1. (2pts) Decide (with reasons) if this a valid arguments:

   If people are crazy, then they should be in an asylum. I am in an asylum. Therefore I am crazy.

This is an invalid argument, because the statement only argues that all crazy people should be in an asylum. It does not state that everyone in an asylum is crazy. Moreover, there is nothing stating what people are in an asylum, but only what people should be in one. There might be people who should be in one but aren't, and vice versa.

good point!

MAT385 Quiz 02, Spring 2023

Name: Joellian

1. (2pts) Decide (with reasons) if this a valid arguments:

   If people are crazy, then they should be in an asylum. I am in an asylum. Therefore I am crazy.

   This statement is valid because the implication statement crazy people should be in an asylum and I am in an asylum is true. The conclusion therefore I am crazy can be prove with no problem.

   $(P \to A) \wedge P \not\leftrightarrow (P \to A) \wedge A$

2. (4pts) Use a proof sequence to show that this argument is valid:

   $$(A' \to B') \wedge B \wedge (A \to C) \to C$$

   1. $A' \to B'$ hyp
   2. B hyp
   3. $A \to C$ hyp
   4. $B \to A$ 1, contra
   5. A 2, 4 mp
   6. C 3, 5 mp

1. (2pts) Decide (with reasons) if this a valid arguments: $(C \to A) \wedge A \to C$

If people are crazy, then they should be in an asylum. I am in an asylum. Therefore I am crazy.

No, I don't think that this is a valid argument. The fact that you are in an asylum does not necessarily mean you are crazy. There could be other conditions that might warrant being placed in an asylum other than being crazy, so I wouldn't assume that you are crazy, even if it is a possibility. Given the two statements, I could prove the conclusion if the first implication was reversed, but I can't prove the following wff: $(C \to A) \wedge A \to C$.

Good ✓

2. (4pts) Use a proof sequence to show that this argument is valid:

$$(A' \to B') \wedge B \wedge (A \to C) \to C$$

1.	$A' \to B'$	hyp
2.	B	hyp
3.	$A \to C$	hyp
4.	$B \to A$	1, contrapositive ✓
5.	$B \to C$	3, 4, hs
6.	C	2, 5, mp

2. (4pts) Use a proof sequence to show that this argument is valid:

$$(A' \to B') \wedge B \wedge (A \to C) \to C$$

1.) $(A' \to B')$ hyp

2.) B hyp

3.) $A \to C$ hyp

4.) $B \to A$ 1 contrapositive

5.) A 2, 4 MP

6.) C 3, 5 MP

Good

The statement is valid

2. (4pts) Use a proof sequence to show that this argument is valid:

$$(A' \to B') \wedge B \wedge (A \to C) \to C$$

1. $A' \to B'$ hyp
2. B hyp
3. $A \to C$ hyp
4. $(A')'$ 1, 2, mt
5. A 4, dn
6. C 3, 5, mp

Good

3. (4pts) Convert the following argument into a wff, and then prove it:

If the ad is successful, then the sales volume will go up. Either the ad is successful or the store will close. The sales volume will not go up. Therefore the store will close.

Use the statement letters

- A – the ad is successful
- S – sales volume will go up
- C – the store will close

$$(A \to S) \wedge (A \vee C) \wedge S' \to C$$

1. $A \to S$	Hyp
2. $A \vee C$	Hyp
3. S'	Hyp
4. A'	1, 3, MT
5. C	2, 4, DS

3. (4pts) Convert the following argument into a wff, and then prove it:

If the ad is successful, then the sales volume will go up. Either the ad is successful or the store will close. The sales volume will not go up. Therefore the store will close.

Use the statement letters

- A – the ad is successful
- S – sales volume will go up
- C – the store will close

$$(A \to S) \wedge (A \vee C) \wedge S' \to C$$

1. $A \to S$ hyp
2. $A \vee C$ hyp
3. S' hyp
4. A' 1,3, mt
5. $A' \to C$ 2 imp
6. C 4,5, MP

3. (4pts) Convert the following argument into a wff, and then prove it:

If the ad is successful, then the sales volume will go up. Either the ad is successful or the store will close. The sales volume will not go up. Therefore the store will close.

Use the statement letters

- A – the ad is successful
- S – sales volume will go up
- C – the store will close

$(A \to S) \wedge (A \vee C) \wedge S' \to C$

1. $A \to S$ Hyp
2. $A \vee C$ Hyp
3. S' Hyp
4. $S' \to A'$ 1, Cont
5. A' 3,4, mp
6. $A' \to C$ 2, definiton of implication
7. C 5,6, mp

3. (4pts) Convert the following argument into a wff, and then prove it:

If the ad is successful, then the sales volume will go up. Either the ad is successful or the store will close. The sales volume will not go up. Therefore the store will close.

Use the statement letters

- A – the ad is successful
- S – sales volume will go up
- C – the store will close

$((A \to S) \wedge (A \vee C) \wedge S' \to C$

1. $A \to S$ hyp
2. $A \vee C$ hyp
3. S' hyp
4. $(A')' \vee C$ 2, DN
5. $A' \to C$ 4, IMP
6. A' 3, 1, MT
7. C 5, 6, MP

3. (4pts) Convert the following argument into a wff, and then prove it:

If the ad is successful, then the sales volume will go up. Either the ad is successful or the store will close. The sales volume will not go up. Therefore the store will close.

Use the statement letters

- A – the ad is successful
- S – sales volume will go up
- C – the store will close

$$(A \to S) \wedge (A \vee C) \wedge S' \to C$$

1.	$A \to S$	hyp
2.	$A \vee C$	hyp
3.	S'	hyp
4.	$S' \to A'$	1, contrapositive
5.	A'	3, 4, mp
6.	C	2, 5, disjunctive syllogism