Exercises 1.1

1. Which of the following are propositions?
   1. Pigs can fly.
   2. What?
   3. I don’t know.
   4. I like tofu.
2. Which of the following are propositions?
   1. How far?
   2. Portland is not in Oregon.
   3. Portland Community College.
   4. It is raining.
3. Write the negation of each proposition.
   1. I ride my bike to campus.
   2. Portland is not in Oregon.
4. Write the negation of each proposition.
   1. You should see this movie.
   2. Lashonda is wearing blue.
5. Write a proposition that contains a double negative.
6. Write a proposition that contains a triple negative.
7. For each situation, decide whether the “or” is most likely exclusive or inclusive.
   1. An entrée at a restaurant includes soup or salad.
   2. You should bring an umbrella or a raincoat with you.
8. For each situation, decide whether the “or” is most likely exclusive or inclusive.
   1. We can keep driving on I-5 or get on I-405 at the next exit.
   2. You should save this document on your computer or a flash drive.
9. For each situation, decide whether the “or” is most likely exclusive or inclusive.
10. I will wear a sweater or a jacket.
11. My next vacation will be on the Oregon Coast or Mount Hood ADD
12. For each situation, decide whether the “or” is most likely exclusive or inclusive.
13. While in California I will go to the beach or Disneyland.
14. The insurance agent offers car or boat insurance. ADD
15. Rewrite the statement in the conditional form *if p, then q.*
16. Whenever it is sunny, I go swimming.
17. I go see a movie on Fridays. ADD
18. Rewrite the statement in the conditional form *if p, then q.*
19. I always carry an umbrella when it rains.
20. On the weekend I like to hang out with friends. ADD
21. Translate each statement from symbolic notation into English sentences. Let *A* represent “Elvis is alive” and let *K* represent “Elvis is the King.”
    1. *Not A*
    2. *A or K*
    3. *Not A and K*
    4. *If K, then not A*
22. Translate each statement from symbolic notation into English sentences. Let *A* represent “It rains in Oregon” and let *B* represent “I own an umbrella.”
    1. *Not B*
    2. *A and not B*
    3. *If A, then B*
    4. *If not B, then A*
23. Translate each statement from English sentences into symbolic notation. Let *A* represent “I will protest” and let *B* represent “There is injustice.”
24. There is injustice and I will protest
25. If there is injustice, then I will protest.
26. I will protest if there is injustice.
27. If there is not injustice, then I will not protest. ADD
28. Translate each statement from English sentences into symbolic notation. Let *A* represent “It’s time to eat” and let *B* represent “I am hungry.” ADD
29. It’s time to eat and I’m not hungry
30. It’s not time to eat.
31. If it’s time to eat, then I’m hungry
32. If I’m not hungry then it’s not time to eat.
33. Determine if the entire statement is true or false. ADD
34. An apple is a vegetable, or an apple is a fruit.
35. Portland is not a city in Oregon.
36. Determine if the entire statement is true or false. ADD
37. Fish can walk and birds can swim.
38. If it is warm outside, then it is sunny.

Complete the truth table for each statement and write the meaning of each statement in the third column.

1. *Let A be: I live in Oregon*

*Let B be: I go to Portland Community College* ADD

*A and B*

|  |  |  |
| --- | --- | --- |
| *A* | *B* | *A and B* |
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1. *Let A be: I am a psychology major*

*Let B be: I’m planning to transfer to Portland State* ADD

*A or B*

|  |  |  |
| --- | --- | --- |
| *A* | *B* | *A or B* |
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|  |  |  |
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*Complete the truth table for each statement.*

1. *A and not B* ADD

|  |  |  |  |
| --- | --- | --- | --- |
| *A* | *B* | *Not B* | *A and not B* |
|  |  |  |  |
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1. *Not (not A or B)* ADD

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *A* | *B* | *Not A* | *Not A or B* | *Not (not A or B)* |
|  |  |  |  |  |
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1. *Not (A and B and C)* ADD

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *A* | *B* | *C* | *A and B and C* | *Not (A and B and C)* |
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1. *Not A or (not B and C)* ADD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *A* | *B* | *C* | *Not A* | *Not B* | *not B and C* | *Not A or (not B and C)* |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
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Create a complete truth table for each statement. ADD check order

1. *Not (A and B) or C*
2. *(A or B) and (A or C)*
3. *If A and B, then C*
4. *If A or B, then not C*
5. *If A and C, then not A*
6. *If B or C, then (A and B)*

**Section 1.1 Homework Solutions**

1. a. Proposition

b. Not a proposition

c. Proposition

d. Proposition

1. a. Not a proposition

b. Proposition

c. Not a proposition

d. Proposition

3. a. I do not ride my bike to campus

b. Portland is in Oregon

4. a. You should not see this movie.

b. Lashonda is not wearing blue.

5. Answers will vary. Example: You can’t not do your homework

6. Answers will vary. Example: They decided not to cancel the ban on pesticides.

7. a. Exclusive

b. Inclusive

8. a. Exclusive

b. Inclusive

9. a. Inclusive

b. Exclusive

10. a. Inclusive

b. Inclusive

11. a. If it is sunny, then I will go swimming.

b. If it is Friday, then I will go see a movie.

12. a. If it is raining, then I carry an umbrella.

b. If it is the weekend, then I am hanging out with friends.

13. a. Elvis is not alive

b. Elvis is alive or Elvis is the King

c. Elvis is not alive and Elvis is the King

d. If Elvis is the King, then Elvis is not alive

14. a. I do not own an umbrella.

b. It rains in Oregon and I do not own an umbrella

c. If it rains in Oregon, then I own an umbrella

d. If I do not own an umbrella, then it rains in Oregon

15. a. B and A

b. If B, then A

c. If B, then A

d. If not B, then not A

16. a. A and not B

b. Not A

c. If A, then B

d. If not B, then not A

17.

1. True
2. False

18.

a. False

b. False

*19.*

|  |  |  |
| --- | --- | --- |
| ***A*** | ***B*** | ***A and B*** |
| T | T | T  I live in Oregon and I go to PCC |
| T | F | F  I live in Oregon and I don’t go to PCC |
| F | T | F  I don’t live in Oregon and I go to PCC |
| F | F | F  I don’t live in Oregon and I don’t go to PCC |

*20.*

|  |  |  |
| --- | --- | --- |
| ***A*** | ***B*** | ***A or B*** |
| T | T | T  I am a psychology major and I’m planning to transfer to PSU |
| T | F | T  I am a psychology major but I’m not planning to transfer to PSU |
| F | T | T  I am not a psychology major, but I am planning to transfer to PSU |
| F | F | F  I am not a psychology major and I’m not planning to transfer to PSU |

*21.*

|  |  |  |  |
| --- | --- | --- | --- |
| ***A*** | ***B*** | ***Not B*** | ***A and not B*** |
| T | T | F | F |
| T | F | T | T |
| F | T | F | F |
| F | F | T | F |

22.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **A** | **B** | **Not A** | **Not A or B** | **Not (Not A or B)** |
| T | T | F | T | F |
| T | F | F | F | T |
| F | T | T | T | F |
| F | F | T | T | F |

23.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***A*** | ***B*** | ***C*** | ***A and B and C*** | ***Not (A and B and C)*** |
| T | T | T | T | F |
| T | T | F | F | T |
| T | F | T | F | T |
| T | F | F | F | T |
| F | T | T | F | T |
| F | T | F | F | T |
| F | F | T | F | T |
| F | F | F | F | T |

24.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***A*** | ***B*** | ***C*** | ***Not A*** | ***Not B*** | ***Not B and C*** | ***Not A or (not B and C)*** |
| T | T | T | F | F | F | F |
| T | T | F | F | F | F | F |
| T | F | T | F | T | T | T |
| T | F | F | F | T | F | F |
| F | T | T | T | F | F | T |
| F | T | F | T | F | F | T |
| F | F | T | T | T | T | T |
| F | F | F | T | T | F | T |

25.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***A*** | ***B*** | ***C*** | ***A and B*** | ***Not (A and B)*** | ***Not (A and B) or C*** |
| T | T | T | T | F | T |
| T | T | F | T | F | F |
| T | F | T | F | T | T |
| T | F | F | F | T | T |
| F | T | T | F | T | T |
| F | T | F | F | T | T |
| F | F | T | F | T | T |
| F | F | F | F | T | T |

26.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***A*** | ***B*** | ***C*** | ***A or B*** | ***A or C*** | ***(A or B) and (A or C)*** |
| T | T | T | T | T | T |
| T | T | F | T | T | T |
| T | F | T | T | T | T |
| T | F | F | T | T | T |
| F | T | T | T | T | T |
| F | T | F | T | F | F |
| F | F | T | F | T | F |
| F | F | F | F | F | F |

27.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***A*** | ***B*** | ***C*** | ***A and B*** | ***If (A and B), then C*** |
| T | T | T | T | T |
| T | T | F | T | F |
| T | F | T | F | T |
| T | F | F | F | T |
| F | T | T | F | T |
| F | T | F | F | T |
| F | F | T | F | T |
| F | F | F | F | T |

28.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***A*** | ***B*** | ***C*** | ***A or B*** | ***Not C*** | ***If (A or B), then not C*** |
| T | T | T | T | F | F |
| T | T | F | T | T | T |
| T | F | T | T | F | F |
| T | F | F | T | T | T |
| F | T | T | T | F | F |
| F | T | F | T | T | T |
| F | F | T | F | F | T |
| F | F | F | F | T | T |

29.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***A*** | ***C*** | ***A and C*** | ***Not A*** | ***If (A and C), then not A*** |
| T | T | T | F | F |
| T | F | F | F | T |
| F | T | F | T | T |
| F | F | F | T | T |

30.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***A*** | ***B*** | ***C*** | ***B or C*** | ***A and B*** | ***If (B or C), then (A and B)*** |
| T | T | T | T | T | T |
| T | T | F | T | T | T |
| T | F | T | T | F | F |
| T | F | F | F | F | T |
| F | T | T | T | F | F |
| F | T | F | T | F | F |
| F | F | T | T | F | F |
| F | F | F | F | F | T |