Answer Key for Discrete and Logic Adventure RPG: A Quest to Heal a Mother's Sickness

Level 1:

Answer: Odd

Explanation:

Let “I have an odd number of coins” = p,

Let “I have an even number of them” = q,

The statement “I have an odd or even number of them” = p OR q (p V q)

The statement “I don’t have an even number of coins” = NOT p (~p)

The Conclusion becomes: q = “even” By Elimination

Level 2:

Answer: 10

Explanation:

10 is the only number less than 20, even, and divisible by 5,

Level 3:

Answer: 10

Explanation:

Carefully reading the storyline will show you that the answer was directly related to the last Level.

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<u>Level 5:</u>

Answer: The path on the left with the trees is safe.

Explanation:

If you take what the **merchant** says as truth, and negate the words of the **Bridgetown** native:

Let p = "The path on the left with the trees is safe."

Let q = "The path on the right with the bridge is safe."

Merchant's Words: p V q "p OR q"

Bridgetown Native's Words: (p -> q) "q IF p"

1. (p -> q) = (~p V q) By **Bridgetown Native's Words** and the Disjunctive Form of a Conditional

a.k.a. (IF p, THEN q = (NOT p) OR q)

2. (p ^ ~q) By Negation of **Bridgetown Native's Words**

a.k.a. (p AND (NOT q))

3. Therefore, ~q By Specialization (Valid Argument Form)

a.k.a. (NOT q)

4. (p V q) By **Merchant's Words**

a.k.a. (p OR q)

5. ~q By Conclusion of (3)

6. Therefore, p By Elimination (Valid Argument Form)

<u>Level 6:</u>

Answer: By Tanner's Shop.

Explanation:

If you take what **Ann** says as truth, and negate the words of the **Bridgetown** husband:

Let p = "The gate is by the pier near the lake."

Let q = "The gate is by Tanner's old Tinker shop."

Ann's Words: (p ^ (~q)) V ((~p) ^ q) "p OR q, but NOT BOTH"

Bridgetown Husband's Words: (p ^ (~q) "p AND (NOT q)"

1. (p ^ (~q)) V ((~p) ^ q) By **Ann's Words** and the Disjunctive Form of a Conditional

a.k.a. (p OR q, but NOT BOTH)

2. ~(p ^ (~q)) By Negation of **Bridgetown Husband's Words**

a.k.a. (p AND (NOT q))

3. Therefore, ((~p) ^ q) By Elimination (Valid Argument Form)

a.k.a. ((NOT p) AND q)

4. q By Specialization (Valid Argument Form) of the Conclusion made in (3)

Level 7:

Answer: Red pressed, NOT Yellow pressed, Green pressed, and NOT Blue pressed = RNYGNB

Explanation:

*This table below shows all of the logically possible Button Combinations. The rows of the table highlighted in red indicate the eight possibilities that do not have any two buttons pressed adjacent to each other. When looking at the rows in red, it is clear (when starting your counting at 0) that row 10 is the only one of those eight possibilities that have the Green button pressed. This table gives a "0" for the logic state of a button being "unpressed" and a "1" for the logic state of a button that is being "pressed".

Red Button	Yellow Button	Green Button	Blue Button
0	0	0	0
0	0	0	1
0	0	1	0
0	0	1	1
0	1	0	0
0	1	0	1
0	1	1	0
0	1	1	1
1	0	0	0
1	0	0	1
1	0	1	0
1	0	1	1
1	1	0	0
1	1	0	1
1	1	1	0
1	1	1	1

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Level 8:

Answer: F=(R’+Y+G’+B)’

Explanation:

Based on **Level 7**, the R, Y, G, and B variables represent the logic state of “1” for each respective button color “being pressed”. Any letter variable with a ’ (a.k.a. a negation) next to it represents that variable logic state of “0” for each respective button color NOT “being pressed”. This is easily deducible if you construct a table as in the Explanation for Level 7, where the 1’s and 0’s give you the states of the variables needed to form the equation).

Also, using + and F= with no spaces between any of the variables and negation symbols, you can conceptualize the answer row in the table in the Explanation of Level 7 like so, with the (*) symbol meaning AND:

F=R*Y’*G*B’

However, since you must use only OR operators, you must negate the expression above like so (again, be sure not to add any spaces between any of the variables, the F=, or the negation symbols):

F=(R’+Y+G’+B)’

Level 10:

Answer: nextWeek’sCrate

Explanation:

Let p = “The Miners started working early in the morning.”

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Let q = “We are/were behind schedule.”

Let r = “I didn’t want us to get ahead.”

Let d = “I must’ve stashed the ruby in next week’s crate.”

Let e = “The ruby is in my pocket.”

Let b = “The ruby is in my office.”

Let c = “Many has it (“it” being the ruby).”

1. b -> (q V r) By (5) in Ruby’s dialogue in the problem information.

(a.k.a. IF p then (q or r))

((~q) ^ (~r)) = ~(q V r) By (2) in Ruby’s dialogue in the problem information.

(a.k.a. ((NOT q) AND (NOT r)) = NOT(q OR r))

Therefore, (~b) (a.k.a. NOT b) By the Modus Tollens Valid Argument Form for a Conditional

2. (~b) -> (d V c) By (3) in Ruby’s dialogue in the problem information.

(a.k.a. IF (NOT b) THEN, (d OR c))

(~b) By Conclusion of (1)

Therefore, (d V c) By the Modus Pollens Valid Argument Form for a Conditional

3. (~q) ^ (~r) By (2) in Ruby’s dialogue in the problem information.

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(a.k.a. (NOT q) AND (NOT r))

Therefore, (~r) By Specialization (Valid Argument Form)

4. (~r) -> (~e) By (4) in Ruby’s Dialogue in the problem information.

(a.k.a. IF (NOT r), THEN (NOT e))

(~r) By Conclusion of (3)

Therefore, (~e) By the Modus Tollens Valid Argument Form of a Conditional

5. (~q) ^ (~r) By (2) in Ruby’s dialogue in the problem information.

Therefore, (~q) By Specialization (Valid Argument Form)

6. p -> q By (1) in Ruby’s Dialogue in the problem information.

(~q) By Conclusion of (5)

Therefore, (~p) By the Modus Tollens Valid Argument Form of a Conditional

7. c -> p By (6) in Ruby’s Dialogue in the problem information.

(~p) By Conclusion of (6)

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Therefore, (~c) By the Modus Tollens Valid Argument Form of a Conditional

8. (d V c) By Conclusion of (2)

(~c) By Conclusion of (7)

Therefore, d By Elimination (Valid Argument Form)