Who owns the zebra?

This is one of my all time favourite logic puzzles. I usually set this puzzle up with a grid, where the columns represent the different characteristics such as house colour, nationalities, pets, drinks, and cigarettes. The rows then represent the different nationalities: Englishmen, Spaniard, Ukranian, etc. I then take the clues, that are not in any specific order, and put a cross in the box if I can eliminate one. When I am sure of a box's value I put a check mark in that. When all is done, you'll find that you have one box unchecked under the drink, and one box unchecked under the pet. These are the answers to the puzzle. Have fun, answer next week.

(1) There are five houses, each of a different colour and inhabited by men of different nationalities with different pets, drinks and cigarettes.

(2) The Englishman lives in the red house.

(3) The Spaniard owns the dog.

(4) Coffee is drunk in the green house.

(5) The Ukranian drinks tea.

(6) The green house is immediately to the right (your right) if the ivory house.

(7) The Old Gold smoker owns snails.

(8) Kools are smoked in the yellow house.

(9) Milk is drunk in the middle house.

(10) The Norwegian lives in the first house on the left.

(11) The man who smokes Chesterfields lives in the house next to the man who owns the fox.

(12) Kools are smoked in the house next to the house where the horse is kept.

(13) The Lucky Strike smoker drinks Orange Juice.

(14) The Japanese smokes Parliament.

(15) The Norwegian lives next to the blue house.

Question→ Who drinks water? And
Who owns the zebra?

Answer to Last Week's Question

Last week's question had little Johnny simplifying $\frac{16}{64}$ by crossing out the 6's and leaving $\frac{1\not{6}}{\not{6}4} = \frac{1}{4}$. Of course this only works with some fractions. Your mission, if you chose to try it, was the find the 13 fractions in the form of $\frac{ab}{bc}$ that actually work. Both numerator and denominator are two digit numbers and the one's digit of the numerator is equal to the ten's digit on the denominator. When these two digits are cancelled, the result must be an equivalent fraction like: $\frac{a\not{b}}{\not{b}c} = \frac{a}{c}$.

The actual value of a number with digits "ab" is 10a + b. The actual value of a number with digits "bc" is 10b + c. So, the requirements are that: $\frac{10a+b}{10b+c} = \frac{a}{c}$

Cross multiplying we get :	10ac + bc = 10ab + ac
Moving terms across equal sign, we get:	10ac − 1ac = 10ab − bc
Simplifying and factoring out a "b" we get:	9ac = (10a − c)b

Dividing both sides by the bracket, we get: $$\frac{9ac}{10a-c} = b$$

At this point I tried a couple of values for "a" and "c" as this is a type of Diophatine Equation that must be solved with integers only.

Letting a = 1, and c = 1, I got b = 1, this yields an answer of $\frac{11}{11}$, which certainly works.

Letting a = 2, and c = 2, I got b = 2, this yields an answer of $\frac{22}{22}$, which also works.

Letting a = 3, and c = 3, I got b = 3, this yields an answer of $\frac{33}{33}$, which also works.

Ahaha, there seems to be a pattern here. Let's take the equation $\frac{9ac}{10a-c} = b$

and let **a = c**, then $\frac{9aa}{10a-1a} = b$, **or** $\frac{9a^2}{9a} = b \rightarrow b = a$. In other words we will always get **a = b = c.**

So are first answers are : $\frac{11}{11}, \frac{22}{22}, \frac{33}{33}, \frac{44}{44}, \frac{55}{55}, \frac{66}{66}, \frac{77}{77}, \frac{88}{88}, \frac{99}{99}$

Now I didn't want to just keep guessing numbers by hand, so I made up the following spreadsheet to test all the combinations for me.

a	c	b	Numerator	Denominator
1	1	1	11	11
1	2	2.25		
1	3	3.857142857		
1	4	6	16	64
1	5	9	19	95

1	6	13.5		
1	7	21		
1	8	36		
1	9	81		
2	1	0.947368421		
2	2	2	22	22
2	3	3.176470588		
2	4	4.5		
2	5	6	26	65
2	6	7.714285714		
2	7	9.692307692		
2	8	12		
2	9	14.72727273		
3	1	0.931034483		
3	2	1.928571429		
3	3	3	33	33
3	4	4.153846154		
3	5	5.4		
3	6	6.75		
3	7	8.217391304		
3	8	9.818181818		
3	9	11.57142857		
4	1	0.923076923		
4	2	1.894736842		
4	3	2.918918919		
4	4	4	44	44
4	5	5.142857143		
4	6	6.352941176		
4	7	7.636363636		
4	8	9	49	98
4	9	10.4516129		
5	1	0.918367347		
5	2	1.875		
5	3	2.872340426		
5	4	3.913043478		
5	5	5	55	55
5	6	6.136363636		
5	7	7.325581395		
5	8	8.571428571		
5	9	9.87804878		
6	1	0.915254237		
6	2	1.862068966		
6	3	2.842105263		
6	4	3.857142857		
6	5	4.909090909		
6	6	6	66	66
6	7	7.132075472		
6	8	8.307692308		
6	9	9.529411765		
7	1	0.913043478		
7	2	1.852941176		
7	3	2.820895522		

7	4	3.818181818		
7	5	4.846153846		
7	6	5.90625		
7	7	7	77	77
7	8	8.129032258		
7	9	9.295081967		
8	1	0.911392405		
8	2	1.846153846		
8	3	2.805194805		
8	4	3.789473684		
8	5	4.8		
8	6	5.837837838		
8	7	6.904109589		
8	8	8	88	88
8	9	9.126760563		
9	1	0.91011236		
9	2	1.840909091		
9	3	2.793103448		
9	4	3.76744186		
9	5	4.764705882		
9	6	5.785714286		
9	7	6.831325301		
9	8	7.902439024		
9	9	9	99	99

The formula I used for column “D” was:=IF(AND(C2-INT(C2)=0,C2<10),10*A2+C2," ")
The formula I used for column “E” was:=IF(AND(C2-INT(C2)=0,C2<10),10*C2+B2," ")

The other four fractions that work are: $\frac{16}{64}, \frac{19}{95}, \frac{26}{65}, \frac{49}{98}$

So, altogether we get 13 fractions that work, four of which do not have all four digits the same.