How I know my multiplication tables

In which I discover that the only multiplications I have memorised are 6 x 7 and 7 x 8.

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Many of my art students tell me that the thing that really put them off mathematics was having to memorise multiplication tables. I have great sympathy for this and personally never did memorise my multiplication tables. And yet I can multiply! I realised that I do it by working things out, with a small number of exceptions. I do it quickly enough that it is just as fast as having "memorised" it, with the advantage that I never had to sit down and memorise it. The only disadvantage I can see is that it's not innate enough for me to be able to multiply numbers bigger than 10 easily, and so I'll never be a human calculator: what a pity. Not.

Here's an honest analysis of how I do my times tables up to 9.

The first thing I've observed is that I can't multiply anything if I use the word "multiply" or "times". I have to turn "two times four" into "two fours" in my head first. For many situations I use a combination of visualisation, and oral/aural memory of how the words sound, just like when you remember the words of a song without having ever sat down and deliberately memorised them. I use this combination simultaneously, to cross check my answer.

I do all this in a split second, so if you watch me do it you won't notice it happening, unless you watch my eyes very carefully.

General patterns

- I can double all the numbers up to 9, by a combination of practice of counting in 2's, visualising two rows of dots, and aural memory.
- I can square all the numbers up to 9, by a combination of visualising square grids (for the smaller ones) and familiarity
- I can multiply by 5 because it's the same as multiplying by 10 and dividing by 2 (or the other way round)
- I use a lot of commutativity ($a \times b = b \times a$)

2 x 2 square
Higher multiples of 2: commutativity

2 x 3 double
3 x 3 square
Higher multiples of 3: commutativity

2 x 4 double
3 x 4 familiarity with a 3 by 4 grid

4 x 4 square
5 x 4 half of 40, and familiarity
6 x 4 "six fours are twenty four" like a song, and 20 + 4, and 30 - 6
7 x 4 "seven fours are twenty eight" like a song, and double 14
Higher multiples of 4: commutativity

2 x 5 double
3 x 5 counting in fives
4 x 5 counting in fives
5 x 5 square
6 x 5 counting in fives
7 x 5 half of 70, also halfway between 30 and 40
Higher multiples of 5: commutativity

2 x 6 double
3 x 6 double 6 plus 6, and familiarity
4 x 6 commutativity
5 x 6 commutativity
6 x 6 square
Higher multiples of 6: commutativity

2 x 7 double
3 x 7 double 7 plus 7, and familiarity
4 x 7 commutativity
5 x 7 commutativity
6 x 7 "six sevens are forty two" like a song
7 x 7 square
Higher multiples of 7: commutativity

2 x 8 double
3 x 8 double 8 plus 8, and familiarity
4 x 8 double 16, also 40 - 8, also familiarity
5 x 8 half 8 times 10, also familiarity
6 x 8 "six eights are forty eight" like a song, and 40 + 8
7 x 8 "seven eights are fifty six" like a song
8 x 8 square
9 x 8 commutativity

2 x 9 double
3 x 9 30 - 3
4 x 9 40 - 4
5 x 9 half 9 times 10
6 x 9 "six nines are fifty four" like a song, and 60 - 6
7 x 9 70 - 7
8 x 9 80 - 8
9 x 9 square