Sixth Grade Math Tricks

1. Multiplication and zeroes. When multiplying two numbers, ignore all ending zeroes, do the multiplication, and then add the zeroes back onto the answer.
   Example: For 4000·300, we multiply 4 times 3, and then add on the 5 zeroes giving a result of 1,200,000.
2. Division and Zeroes. When dividing two numbers that both end in zeroes, cancel the same number of ending zeroes from each of the two numbers, then do the division problem.
   Example: For 24000÷600, we cancel two zeroes from both numbers, and then divide 240 by 6 to get 40.
3. Multiplying and Dividing by 10, 100, 1000, etc. Simply move the decimal point!
   Example: 634.6÷100 = 6.346 We move the decimal point 2 places because there are 2 zeroes in 100.
   Example: 48.37·1000 = 48370 The decimal point gets moved 3 places since there are 3 zeroes in 1000.
4. Adding Numbers by Grouping. Search for digits that add up to 10 or 20.
   Example: For 97 + 86 + 13 + 42 + 54, we see that with the ones' digits we can add 7 + 3 and 6 + 4 to make ten twice, leaving the 2 (from the 42) left over. The sum of the ones' column is therefore 22. In the tens' column, the carry of 2 combines with the 8 to form 10, as does the 9 and the 1. We are left with the 4 and 5. The tens' column is therefore 29. Our answer is 292.
5. Multiplying by 4. You can instead double the number two times.
   Example: For 4·35, we double 35 to get 70, and double again to get a result of 140.
6. Multiplying a 2-digit number by 11. Separate the digits, and then insert the sum of the digits in-between.
   Example: For 62·11, 6 plus 2 is 8, so we place the 8 between the 6 and the 2, giving a result of 682.
   Example: For 75·11, 7 plus 5 is 12, so we place the 2 between the 7 and 5 and carry the 1, giving 825.
7. Multiplying two numbers that are just over 100. First write down a 1, then next to the one we write down the sum of how far above 100 the two numbers are, and then the product of how far above 100 the two numbers are. Both the sum and the product must be two digits.
   Example: For 105·102, add 5 plus 2 (to get 07), and then multiply 5 times 2 (to get 10), giving 10710.
   Example: For 112·107, we do 12 + 7 (19) and then 12·7 (84), which leads to an answer of 11984.
8. Dividing by 4. You can instead cut the number in half, two times.
   Example: For 64÷4, we take half of 64 to get 32, and then take half of that for a result of 16.
9. Subtraction by Adding Distances. Pick an "easy" number between the two numbers, and add the distances from each of the numbers to the easy number.
   Example: For 532−497, choose 500 as the easy number. The distance from 532 to 500 is 32 and the distance from 497 to 500 is 3. The answer is therefore 32+3, which is 35.
10. Division by Nines. When dividing two numbers where the divisor's digits are all nines, we get a decimal where the dividend repeats, but the number of repeating digits must be equal to the number of nines.
    Example: $38 \div 99 = 0.\overline{38}$ **Example:** $417 \div 999 = 0.\overline{417}$ **Example:** $62 \div 999 = 0.\overline{062}$
11. Multiplying by Nines.
    Method #1: Multiply by 10, 100, or 1000, and then subtract the original number.
    Example: For 47·99, we do 100·47 − 47, which is 4700−47, giving an answer of 4653.
    Method #2 (for single digits)**:** Multiply the single digit by 9, which gives us a two-digit answer. Then separate these two digits and insert one less nine than what was in the original problem.
    Example: For 8·9999, we multiply 8 times 9, which gives us 72. Then we insert three nines between the 7 and the 2, giving a final answer of 79,992.
12. Reducing before Dividing. Any division problem is viewed as a fraction that can often be reduced.
    Example: For 3500÷2800, we reduce the fraction to $^5/_4$, which is 1¼ or 1.25.
13. Multiplying by 5. You take half the number, and then add a zero, or move the decimal point.
    Example: For 5·26, we take half of 26 to get 13, and then add a zero, giving us a result of 130.
    Example: For 5·4.18, half of 4.18 is 2.09, and moving the decimal point to the right one place gives 20.9.
14. Dividing by 5. Double the number, and then divide by ten (move the decimal one place to the left).
    Example: For 80÷5, we double 80 and then chop off a zero, giving a result of 16.
    Example: For 93÷5, we double 93 and then move the decimal point one place to the left to get 18.6.

Seventh Grade Math Tricks

1. Multiplying two numbers that are just one above and below a number that is easy to square. The answer is one less than the square of the "easy" number between them.
   Example: For $29 \cdot 31$, we square 30, and then subtract 1, giving a result of 899.
2. Multiplying by 25. You can instead take half the number, two times, and then add two zeros.
   Example: For $25 \cdot 48$, take half of 48 to get 24, and half again to get 12. Adding two zeroes gives 1200.
3. Squaring a number ending in 5. Multiply the tens' digit by the next whole number, then place 25 at the end.
   Example: For 65^2, you multiply 6 times 7, which is 42, and then add 25 at the end to get 4225 as a result.
4. Dividing by 25. Instead, double the number two times, then divide by 100 (move decimal left two places).
   Example: For $108 \div 25$, we double 108 to get 216, and then double it again to get 432. Our answer is 4.32.
5. Multiplying a number by 15 (or 15%). Multiply the number by ten, then add that product to half of itself.
   Example: For $32 \cdot 15$, we add 320 with 160 (which is ½ of 320), giving a result of 480.
   Example: For 15% of 420, we add 10% of 420 (which is 42) to half of that (which is 21), resulting in 63.
6. Multiplying an even number by a number ending in 5. Cut the even number in half, and double the number ending in 5. Multiply the results.
   Example: For $14 \cdot 45$, half of 14 is 7, and twice 45 is 90, giving a result of 7 times 90, which is 630.
7. Dividing by a number ending in 5. Double both numbers, then divide.
   Example: For $180 \div 45$, we double both numbers, giving $360 \div 90$, which is 4.
8. Multiplying two numbers that have the same tens' digits and have ones' digits that add to 10. Multiply the tens' digit by the next whole number, and then place the product of the ones' digits at the end, as two digits.
   Example: For $47 \cdot 43$, we do 4 times 5 (= 20), and then 7 times 3 (= 21), giving a result of 2021.
9. Squaring a two-digit number beginning in 5. Add 25 to the ones' digit, then place the square of the ones' digit (as two digits) at the end.
   Example: For 53^2, we add 25 + 3 (which is 28), then we square 3 (which is 09), giving a result of 2809.
10. Multiplying two numbers that are an equal distance from a number that is easy to square. Subtract the square of the distance from the square of the easy number.
    Example: For $34 \cdot 26$, we notice that the numbers are both 4 from 30. The result is $30^2 - 4^2 = 884$.
11. Squaring a two-digit number ending in 1. Write down a 1. Add the tens' digit to itself, and write down the ones' digit of that answer to the left of the 1 that was first written down, and carry a 1 if it was greater than ten. Now multiply the tens' digit by itself, and add 1 if you had a carry, and write down the result to the left of all that was previously written down. It's easier than you think!
    Example: For 71^2, we write down a 1, add 7 plus 7, write down the 4 (to the left of the original 1), and carry the 1. Lastly we multiply 7 times 7, and add the 1 that was carried. The answer is 5041.
12. Multiplying by an "almost easy" number. Do the multiplication with the easy number, and then adjust.
    Example: For $12 \cdot 39$, we see that 39 is almost 40, so we multiply 12 times 40 (which is 480), and then we adjust by subtracting 12 (because 480 is one 12 too much), giving 468 as our result.
    Example: For $25 \cdot 31$, we see that 31 is almost 30, so we multiply 25 times 30 (which is 750), and then add another 25, giving us a result of 775.
13. Cross multiplying when multiplying two 2-digit numbers. Multiply the 2 ones' digits to get the answer's ones' digit. Carry, if necessary. Cross-multiply to get the tens' digit (see example below). Carry, if necessary. Multiply the 2 numbers' tens' digits in order to get the hundreds' place in the answer.
    Example (without carrying)**:** For $12 \cdot 23$, the answer has a ones' digit of 2 times 3 = 6. Now we cross-multiply to get the answer's tens' digit, which is 2 times 2, plus 1 times 3, which is 7. The answer's hundreds' place is just 1 times 2, which is 2. Our final answer (see underlined digits) is then 276.
    Example (with carrying)**:** For $47 \cdot 28$, we first multiply 7 times 8 (which is 56), which means the answer's ones' digit is 6 with a carry of 5. Then, we cross multiply for the tens' digit (see work at right), doing 7 times 2, plus 4 times 8, plus 5 (the carry), to get 51. This means that the answer's tens' place is 1, with a carry of 5. Finally, we multiply 4 times 2 and add 5 (the carry), which gives 13. The final answer (see underlined digits, above) is 1316.