Some tips for quick calculations

* Squaring numbers ending with 5
$35^2 = 1225$
$75^2 = 5625$

a. Multiply the 10th place digit with its next number ($n \times (n + 1)$)
b. Attach 25 to the product

35×35
10th place digit is 3. Multiply 3 with its next number 4
$3 \times (3 + 1) = 12$. Attach 25 to 12 to make it 1225

65×65
$6 \times (6 + 1) = 6 \times 7 = 42$
Therefore, $65 \times 65 = 4225$

This is applicable to higher digit numbers also.
$245 \times 245 = (24 \times (24 + 1))25 = (24 \times 25)25 = 60025$

* Multiplying two-digit numbers with 11

$24 \times 11 = 264$
a. Add the two digits, 2+4 = 6
b. Place it between the two digits to get 264
c. The product is written as 2(2+4)6

$86 \times 11 = 946$
d. If a two-digit number is obtained, as in 8+6=14
e. The number looks like this 8(8+6)6 = 8(14)6
f. Add 1 to the 10th place digit, 8 to get 9
g. The product becomes 946

* Multiplying three-digit numbers with 11
$361 \times 11 = 3971$

Method same as that for two-digit numbers
a. 3(3+6)(6+1)1 = 3971

8452×11
b. 8(8+4)(4+5)(5+2)2 = 8(12)(9)(7)2 = 92972

riteach

* Identifying if a number is divisible by 11
a. Add all digits in odd places
b. Add all digits in even places
c. Subtract one from the other
d. If either zero or 11 is obtained, then the number is divisible by 11

Ex: 92972
Odd place digits – 9+9+2 = 20
Even place digits – 2+7 = 9
20 – 9 = 11
Therefore, 92972 is divisible by 11

Ex: 634579
Odd places – 3+5+9 = 17
Even places – 6+4+7 = 17
17 – 17 = 0
Therefore, 634579 is divisible by 11

* Identifying if a number is divisible by 9
a. Add all the digits
b. If the sum adds up to 9 or its multiples, the number is divisible by 9

Ex: 769536
7+6+9+5+3+6 = 27
2+7=9
Therefore, 769536 is divisible by 9

For speeding up further, eliminate all 9's in the number, and any two-digit numbers that add up to 9
765 (9 is removed, 3+6=9)
7+6+5 = 18,   1+8=9

* Identifying if a number is divisible by 3 or 6
a. Add all the digits
b. If the sum adds up to 3, 6 or 9, it is divisible by 3
c. If it is an even number, it is divisible by 6

769536 is divisible by 3, 6 and 9

* Adding three consecutive numbers
$7 + 8 + 9 = 24$

a. Multiply the middle number by 3
$7 + 8 + 9 = 8 \times 3 = 24$
$60 + 61 + 62 = 61 \times 3 = 183$

This applies to all odd consecutive numbers (middle number x number of items)
$24 + 25 + 26 + 27 + 28 = 26 \times 5 = 130$
$57 + 58 + 59 + 60 + 61 + 62 + 63 = 60 \times 7 = 420$

For even consecutive numbers, take middle two terms
$14 + 15 + 16 + 17 = (15 + 16) \times {}^4/_2 = 31 \times 2 = 62$
$65 + 66 + 67 + 68 + 69 + 70 = (67 + 68) \times {}^6/_2 = 135 \times 3 = 405$

* Adding consecutive number starting from 1
1+2+3+4+……+50

a. $\dfrac{n \times (n+1)}{2}$ n is the last number, 50
b. $\dfrac{50 \times 51}{2} = 1275$

* Adding consecutive numbers starting from any number
20+21+22+…+39+40

a. $\dfrac{40 \times 41}{2} = 820$
b. $\dfrac{19 \times 20}{2} = 190$
c. $820 - 190 = 630$

* Finding the remainder when a number is divided by 9
6875/9

a. Add all digits
6+8+7+5
b. Here, all four are consecutive numbers. (5+6+7+8 = 13 x 2=26)
c. 2+6=8
d. 8 is the remainder when 6875 is divided by 9

* Squares

Squares of numbers ending with…	Units place of the square
1, 9	1
2, 8	4
3, 7	9
4, 6	6
5	5
0	0