

## Popular Shortcuts – Mental Math

### Multiply by 11 with 2 Digit Number

Write the first and last digits, then add them together to find the middle digit

$$\begin{array}{r} 23 \\ \times 11 \\ \hline 253 \end{array}$$

No regrouping

Regrouping

$$\begin{array}{r} 75 \\ \times 11 \\ \hline 7 \square 5 \\ 825 \end{array}$$

**Proof**

$$10a + b$$

$$\times \underline{10 + 1}$$

$$10a + b$$

$$\underline{100a + 10b}$$

$$100a + (10a + 10b) + b = 100a + (a+b)10 + b$$