

May 1<sup>st</sup>

Work out  $26 \times 93$  and  $62 \times 39$

Find two more pairs of multiplications with the same property.

If  $ab \times cd = ba \times dc$   
state a relationship between a, b, c and d.



$$26 \times 93 = 2418$$

$$62 \times 39 = 2418$$

To find other multiplications with the same property, it makes sense to look at the general form:

$$“ab \times cd” = (10a + b) \times (10c + d) = 100ac + 10(ad + bc) + bd$$

$$“ba \times dc” = (10b + a) \times (10d + c) = 100bd + 10(bc + ad) + ac$$

Hence to be equal,

$$100ac + bd = 100bd + ac \quad (\text{since the middle terms are equal})$$

Rearranging gives

$$99ac = 99bd$$

Hence

$$\mathbf{ac = bd}$$

**i.e. the product of the 10s column = the product of the units column**

In the above case  $2 \times 9 = 3 \times 6$

Other examples include...

$$36 \times 42 = 63 \times 24 = 1512$$

$$32 \times 46 = 23 \times 64 = 1472$$

$$31 \times 26 = 13 \times 62 = 806$$

$$36 \times 21 = 63 \times 12 = 756$$

(There are at least 4 more solutions....)

