## Estimation

When finding an estimate, pupils should know that:

- it is possible to find different estimates that are equally valid
- different mental strategies can be used to find an estimate.


## Steps I to 3: Two-digit $\times$ one-digit

These simple multiplications can be carried out mentally without the need for estimates. For example, in Step I, $23 \times 3$ can be partitioned mentally as $20 \times 3$ and $3 \times 3$ to give 60 and 9 and an (exact) answer of 69 .

## Steps 4, 5, 8, 9 and 10 : Three-digit $\times$ one-digit

The example in Step 8 is $258 \times 3$. Here are three approaches.

| Pupil A | Pupil B | Pupil C |
| :--- | :--- | :--- |
| I will round to the nearest hundred. | I will use 250 as an approximate <br> value because it an easy number to <br> handle mentally. | 258 lies between 200 and 300. <br> So 258 lies between $200 \times 3$ and <br> I think of $300 \times 3$. |
| My estimate is 900. | I think of $25 \times 3=75$. | I estimate that the answer lies <br> between 600 and 900. |
|  | My estimate is 750. |  |

The exact answer is 774 .

## Step I6: Three-digit $x$ any two-digit multiple of 10

The example in Step 16 is $638 \times 40$. This method rounds 638 to 600 and then partitions as $6 \times 100 \times 4 \times 10$.
A pupil may say:
I will round 638 to the nearest 100 to get 600 .
I now need $600 \times 40$.
I take the hundred out of the 600 and the ten out of the 40 . That gives $100 \times 10=1000$
I now have $6 \times 4=24$.
So my estimate is 24 thousand or 24000 .
The exact answer is 25520 .

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