p 058 q5

5. The effect on the graph of $y = f(x)$ if it is transformed to $y = \frac{1}{4}f(3x)$ is

- **A** a vertical stretch by a factor of $\frac{1}{4}$ and a horizontal stretch by a factor of 3
- **B** a vertical stretch by a factor of $\frac{1}{4}$ and a horizontal stretch by a factor of $\frac{1}{3}$
- **C** a vertical stretch by a factor of 4 and a horizontal stretch by a factor of 3
- **D** a vertical stretch by a factor of 4 and a horizontal stretch by a factor of $\frac{1}{3}$

check your theory: the function must fit the following formula:

$$y = af\left[b(x-h)\right] + k$$

- a: vertical stretch
- b: horiz. stretch
- h: horiz. shift L/R
- k: vertical shift U/D

in this Q:

$\therefore$ $a = \frac{1}{4}$; $b = 3$; $h = \emptyset$; $k = \emptyset$ (do nothing here...)

- $a = \frac{1}{4}$ → vertical factors remain as is → $v.f = \frac{1}{4}$
- $b = 3$ → horizontal factors flip upside down → $h.f. = \frac{1}{3}$

this makes option (B)