

554 is the base  $b$  representation of the square of the number whose base  $b$  representation is 24.

What is  $b$  in base 10?

We have

$$\begin{aligned}5b^2 + 5b + 4 &= (2b + 4)^2 \\ &= 4b^2 + 16b + 16\end{aligned}$$

$$\Rightarrow b^2 - 11b - 12 = 0$$

$$\Rightarrow (b - 12)(b + 1) = 0$$

$$\Rightarrow b = 12 \text{ (must be positive)}$$