Some five distinct integers form an arithmetic progression. Is it possible that their product equals $x^{2021}$ for some positive integer $x$?

**Solution:** It is possible.

Consider the arithmetic progression $a, 2a, 3a, 4a, 5a$. The product of these numbers is $120a^5$. We see that $5n+1 = 2021$ when $n = 404$, giving that if $a = 120^{404}$, then arithmetic progression $120^{404}, 2\cdot120^{404}, 3\cdot120^{404}, 4\cdot120^{404}, 5\cdot120^{404}$ has a product of

$$\left(120^{404}\right)(2 \cdot 120^{404})(3 \cdot 120^{404})(4 \cdot 120^{404})(5 \cdot 120^{404}) = 120^{2021},$$

as desired.

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