1 to k let $k=10$

primes $P[i]$ | exponent $a[i]$ greatest perfect power of $P[i]$

2	3	5	7
0	1	2	3

$\therefore 2^3 \times 3^2 \times 5 \times 7 = 2520$

$P[i]^{a[i]}$

let $P[i]=2$

$a[i]$

$2^{1} = 2 < 10$

$2^2 = 4 < 10$

$\boxed{2^3 = 8 < 10}$

$2^4 = 16 \not< 10$

$\therefore a[i]=3$ is the greatest power of $P[i]=2$

let $P[i]=3$

$3^1 = 3 < 10$

$\boxed{3^2 = 9 < 10}$

$3^3 = 20 \not< 10$

$P[i]=3$
$a[i]=2$ is the greatest power of $P[i]=3$

Repeat process for all primes $\leq k$

For a given prime P[i]
we can get a[i] $\Rightarrow$

$$P[i]^{a[i]} = k$$

log both sides

$$\Rightarrow \underline{a[i] \log(P[i]) = \log(k)}$$

$$\Rightarrow a[i] = \frac{\log(k)}{\log(P[i])}$$

This will give float
$\therefore$ we need integer because a[i] is an exponent

$$\Rightarrow a[i] = \text{floor}\left(\frac{\log(k)}{\log(P[i])}\right)$$

$\boxed{\text{TIP}}$
We only need to eval
a[i] for $P[i] < \sqrt{k}$

i.e. k=10
P[i]=2

$$\therefore a[1] = \text{floor}\left(\frac{\log(10)}{\log(2)}\right)$$

$$= \text{floor}(4.32) = 4$$

$$\therefore a[i] = 4$$

$\sqrt{10} = 3.16$

$\therefore$ any $P[i] < 3.16$
ie 2, 3
will have $a[i] > 1$
5, 7 have $a[i] = 1$