```
int hp( int a, int b)
{ int p=1;
  int x=b;
  while ( x % a==0)
  { p *= a; x /= a;}
  return p;
}
```

at i^{th} iteration,

$p = a^i$ and $x = b/p$

$i = 0 \quad p = a^0 \quad x = b/1$

Invariant. Say

$p = a^i, \quad x = b/p.$

if $x \% a == 0$ then

$p = a^{i+1}$ and $x = (b/a^i)/a$

$= b/p.$

If $x \% a != 0$ then loop ends.

If the i^{th} iteration is last,

then a^i divides b but a^{i+1} does not.

returns highest power of a dividing p.