math 8

Prime Factorization + Factor Trees

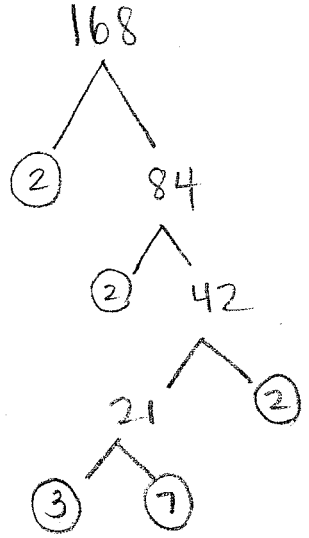
PART ①

TREE: * Take a number. Keep factoring until you are only left with primes.

PF ST: * Write out a "Prime Factorization statement" (list all the primes in order: least → greatest)

Ex. Use a factor tree to determine the PF statement for 168.

Tree:



circle Primes

* Even: can always ÷ 2

* odd: try ÷ 3, ÷ 7

List all primes in order.

PF ST: $168 = 2 \times 2 \times 2 \times 3 \times 7$

OR

$168 = 2^3 \times 3 \times 7$

can use exponents for multiple factors.

ART ②

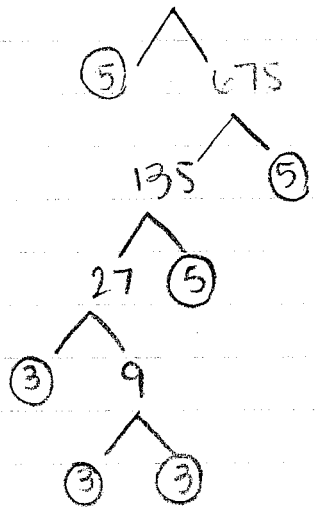
We can PROVE a number is a:

① Perfect square ⟹ factors from a PF st can be arranged into 2 identical groups

② Perfect cube ⟹ factors from a PF st can be arranged into 3 identical groups.

Ex. Is this number a perfect square, perfect cube or neither?

a) 3375



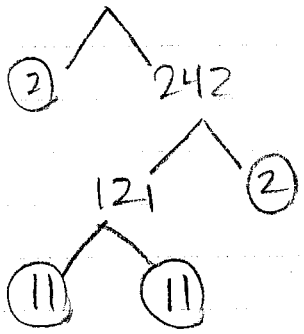
$3375 = 3\times3\times3\times5\times5\times5$

$3375 = 3\times5\times3\times5\times3\times5$

3 identical groups

Perfect CUBE

b) 484



$484 = 2\times2\times11\times11$

$484 = 2\times11\times2\times11$

2 identical groups

Perfect square