Name: _____ Date: _____

Learning Goal 3.2	Given a number or set of numbers, identify the prime factorization of each element and use it to find the GCF, LCM, perfect squares or cubes and/or factored form.

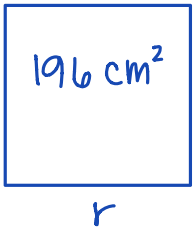
Without a calculator discuss methods you could use to find the side length of a square with an area of $196\ \text{cm}^2$. Pictures may help …

$196 = 2^2 \times 7^2$

2 | 98

2 | 49

7 | 7



$A = r \times r = r^2 = 196\ \text{cm}^2$

$\sqrt{r^2} = \sqrt{196}$

$r = \sqrt{2^2 \times 7^2}$

$= \sqrt{2^2} \times \sqrt{7^2}$

$= 2 \times 7 = 14$

Without a calculator discuss methods you could use to find the side length of a cube with an ~~area~~ volume of $512\ \text{m}^3$. Pictures may help …

$512 = 2^9$

2 | 256

16 | 16

4 | 4 | 4 | 4

2 | 2 | 2 | 2 | 2 | 2 | 2 | 2

$r^3 = 512$

$\sqrt[3]{r^3} = \sqrt[3]{512}$

$r = \sqrt[3]{2^9} \rightarrow = 2^3 = 8\text{m}.$

$= \sqrt[3]{2^3 \times 2^3 \times 2^3}$

$= \sqrt[3]{2^3} \times \sqrt[3]{2^3} \times \sqrt[3]{2^3} = 2 \times 2 \times 2 = 8\text{m}$

Without a calculator discuss how you would find the surface area of the cube from the last question.

Surface Area of a cube = 6 × area of one face

$= 6 \times 8^2$

$= 6 \times 2^6$

$= 2^7 \times 3$

$= 384$

Practice your mental math skills. Try these questions without using a calculator.

1. Find the prime factorization of 210.
2. Find the prime factorization of 546.
3. Find the GCF of 210 and 546.
4. Find the LCM of 210 and 546.
5. Find the prime factorization of 1444.
6. Find the square root of 1444 if it is a perfect square.
7. Find the prime factorization of 729.
8. Find the square root of 729, if it is a perfect square.
9. Find the cube root of 729, if it is a perfect cube.
10. (**Math-lete!**) What is the smallest number you would have to multiply 12 by to make it both a perfect square and a perfect cube?