prove superior to all his predecessors in courage and wisdom.

13. It seems that the government had long been desirous to ascertain your father's real sentiments on that subject.

14. There is no doubt that he was afraid of being punished for his many crimes if he returned to the city.

15. I wish you would let me know as soon as possible when Cæsar is likely to be put in charge of this army.

16. You ought not to have taunted him with cruelty for it seems that he had repeatedly pardoned them.

17 So far from endeavoring to conceal anything from the consuls I laid before them all that I had learned.

18. At my suggestion he pardoned several of the rebels, and gave orders that the women and children should be spared.

19. Instead of bravely encountering the danger, as you had promised to do, you basely sacrificed the public welfare to your own interests.

20. When we were boys we used to cherish such hopes and engage in such enterprises. but times have changed and so have we.

SENIOR LEAVING ALGEBRA.

By Prof. N. F. Dupuis, Queen's College, Kingston.

(Continued from last issue.)

1. (*a*). Find the sum of n terms of a Geometric Series of which the first term is a and the second b.

The ratio is b/a, and the sum is accordingly, $a \cdot \dfrac{(b/a)^n - 1}{b/a - 1}$ or $\dfrac{b^n - a^n}{(b-a)a^{n-2}}$

(*b*) Sum the series to n terms—

$$x + (a+b)x^2 + (a^2 + ab + b^2)x^3 + (a^3 + a^2b + ab^2 + b^3)x^4 + \ldots$$

This series is the same as $\dfrac{a-b}{a-b}x + \dfrac{a^2 - b^2}{a-b}x^2 + \dfrac{a^3 - b^3}{a-b}x^3 + \ldots \dfrac{a^n - b^n}{a-b}x^n$; the

same as $\dfrac{1}{a-b}\left\{ ax + a^2x^2 + a^3x^3 + \ldots a^n x^n - (bx + b^2x^2 + b^3x^3 + \ldots b^n x^n) \right\}$.

and the sum is $\dfrac{1}{a-b}\left\{ ax \cdot \dfrac{a^n x^n - 1}{ax - 1} - bx\,\dfrac{b^n x^n - 1}{bx - 1} \right\}$

(*c*). Show that the geometric mean between a and b is the geometric mean between the arithmetic and harmonic mean between a and b.

The geometric mean between a and b is $\sqrt{ab}$.

" arithmetic " " " " " " $\dfrac{a+b}{2}$

" harmonic " " " " " " $\dfrac{2ab}{a+b}$

And it is required to show that $ab = \dfrac{a+b}{2} \cdot \dfrac{2ab}{a+b}$; which is self-evident.

2. (*a*) Find the sum of the cubes of the first n natural numbers, in the form of an integral function of n.