

healthy as that of Victoria, the capital of Vancouver Island, which is so favourably known. The frontage of Coal Harbour is extensive and the advantages for draining excellent, the land gently undulating. Coal formations of the Tertiary Age are known to exist in the immediate neighbourhood. Timber consisting of maple, Douglas fir, hemlock and spruce is

abundant, and the advantages for future settlement are of no ordinary character.

The public will watch with some interest the opening up of this new outlet for Canadian Commerce and enterprise destined to form the connecting link on the west between the Old and New Worlds under British sway.

SCHOOL WORK.

MATHEMATICS.

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SOLUTIONS.

SEE SEPTEMBER NO.

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1. To show that $12n+5$ cannot be a perfect square.

1. $12n+5$ is an odd number, and to be a square must be the square of an odd number. Hence we would have, if $12n+5$ be a perfect square:—

$$12n+5 = (2p+1)^2 = 4p^2 + 4p + 1,$$

$$\text{or } 12n+4 = 4p^2 + 4p,$$

$$\text{or } 3n+1 = p(p+1).$$

That is, the product of two consecutive numbers would be of the form $3n+1$. But the product of two consecutive numbers can take only the forms:—

$$(3n-1)3n, \text{ or } 3M,$$

$$3n(3n+1), \text{ or } 3N,$$

$$(3n+1)(3n+1-1), \text{ or } 3P-1,$$

and can never take the form $3n+1$. Consequently, $12n+5$ can never assume the form $(2p+1)^2$.

SEE NOVEMBER NO.

2. If the circumference of one circle pass through the centre of another, any two chords of the second drawn from the points

of intersection so as to cut one another in the said circumference will be equal.

2. Let the two circles cut in A and D , the centre of the one C being on the circumference of the other. AB and DE cut in H , which lies on the arc ACD ; join DC , produce to meet circle in F and join FE ; join BC , produce to meet circle in G and join AG ; join AC . $\therefore$ angle CDH = angle CAH = angle CBA . $\therefore$ in the two triangles ABG , DEF , angle FDE = angle ABG , and angle BAG = angle DEF , also $DF = BE$, $\therefore AB = DE$.

3. A straight line meets the produced sides of a triangle ABC in A' , B' , C' , respectively; prove that the triangles ABB' , ACC' , $A'CC'$, $A'B'B'$ will be proportionals.

3. In triangle ABC , AB is produced to C' , AC to B' , BC to A' , and A' , B' , C' lie in the same straight line. Join BB' , CC' .

$$\therefore \frac{AB}{AC} = \frac{\sin C}{\sin B}, \frac{AB'}{AC'} = \frac{\sin C'}{\sin B'}$$

$$\frac{A'C}{A'B'} = \frac{\sin B'}{\sin C'}, \frac{A'C'}{A'B} = \frac{\sin B}{\sin C}.$$

$$\therefore \frac{AB \cdot AB'}{AC \cdot AC'} = \frac{\sin C \sin C'}{\sin B \sin B'},$$

$$\text{and } \frac{A'C \cdot A'C'}{A'B' \cdot AB} = \frac{\sin B' \cdot \sin B}{\sin C \sin C'}.$$

$$\therefore \frac{AB \cdot AB'}{AC \cdot AC'} = \frac{A'B' \cdot AB}{A'C \cdot A'C'}.$$

$$\therefore \frac{AB \cdot AB' \sin A'}{AC \cdot AC' \sin A} = \frac{A'B' \cdot AB' \sin A'}{A'C \cdot A'C' \sin A}$$

$$\therefore \frac{ABB'}{ACC'} = \frac{A'BB'}{A'CC'}.$$