No. 16.

NORMAL SCHOOL FOR UPPER CANADA.

THIRTY-FIFTH SESSION, JUNE, 1866.

Examiners in Department of Mathematics, Chemistry, and Natural Philosophy:
JOHN HERBERT SANGSTER, ESQ., M.A., *Second Master, Normal School.*
REV. WILLIAM ORMISTON, D.D.

GEOMETRY.—JUNIOR DIVISION.

Time—Three Hours.

1. Shew that if the diagonals of a quadrilateral biseet each other it must be a parallelogram.

2. State the difference between direct and indireet demonstrations and number all the propositions of Books I. and II. which involve indireet demonstrations.

3. What are converse propositions? Number all the converse propositions of Book I.

4. Number all the propositions of Book I. that *prove* one given straight line to be parallel to another given straight line. When is a straight line said to be given?

5. If any side of a triangle be produced the exterior angle is equal to the two interior and opposite angles and the three interior angles of any triangle are together equal to two right angles.

6. If from the base of an isoseeles triangle to the opposite sides three straight lines be drawn, making equal angles with the base, viz.: one from its extremity and the other two from any point in it—these two shall be together equal to the first.

7. Give algebraic proofs of Propositions VI. and IX. Book II.

8. In every triangle, the square on the side subtending either of the acute angles, is less than the squares on the sides containing, by twice the rectangle contained by either of these sides, and the straight line intercepted between the acute angle and the perpendicular let fall upon it from the opposite angle.

9. In any quadrilateral figure, the sum of the squares on the diagonals together with four times the square on the line joining their middle points, is equal to the sum of the squares on all the sides.

10. Prove that the square on any straight line drawn from the vertex of an isoseeles triangle to the base, is less than the square on a side of the triangle by the rectangle contained by the segments of the base.