

PROBLEMS—Honors.

PROFESSOR DUPUIS (*Queen's*), EXAMINER.

1. If two numbers be each the sum of two squares, the product of the numbers is the sum of two squares.

2. Find the form of a rectangular field of a given area so that the cost of fencing three sides of it may be the least possible.

3. A boat which can make 10 miles an hour in still water steers at half a right angle up a stream which flows at the rate of 4 miles an hour. Find the real velocity of the boat, and the angle between its direction and that of the stream.

4. A circle is inscribed in an equilateral triangle; a second circle is inscribed to touch the first and two sides of the triangle; a third circle to touch the second and the same two sides, and so on indefinitely. Compare the limit of the sum of the areas of all these circles with that of the circle having the side of the triangle as diameter.

5. If AA_1 , BB_1 be the diagonals of a rectangle, O their point of intersection, and P any point whatever; then

$$PA^2 + PB^2 + PA_1^2 + PB_1^2 = 4PO^2 + AA_1^2.$$

6. Two chords are drawn in a circle. Find a point upon the circle from which perpendiculars upon these chords are proportional to the lengths of the chords.

7. If a , b are the sides of a parallelogram and θ the angle between them, one diagonal is double the other when $\cos \theta = \frac{3}{10} \left(\frac{a}{b} + \frac{b}{a} \right)$.

ENGLISH GRAMMAR AND COMPOSITION.—Pass.

PROFESSOR FERGUSON (*Queen's*), EXAMINER.

1. Point out and explain any peculiarities in the following sentences, and correct any errors:

This convention *was* really the two Houses of Parliament.—*Blackstone*.

His pavilion round about him *were* dark waters and thick clouds of the skies.—*Psalm* xviii. 11.

Every limb and feature *appears* with its appropriate grace.

Now *abideth* faith, hope, charity; these three.—*1 Cor.* xiii. 13.

Thine *is* the kingdom, and the power, and the glory.—*Matt.* iv. 13.

Blessed *is* the people that *know* the joyful sound; *they* shall walk, O Lord, in the light of thy countenance.—*Psalm* lxxxiv. 15.