University of the State of New York

75TH EXAMINATION

ANALYTICAL GEOMETRY

FRIDAY, Jan. 23, 1891—9:15 A. M. to 12:15 P. M., only

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40 *credits, necessary to pass,* 30

Use rectangular co-ordinates unless otherwise mentioned.

1. Define (a) rectangular co-ordinates; (b) equation of a line; (c) ellipse; (d) parabola. 4

2. Construct and discuss the equation $x^2 + y^2 = 16$. 4

3. Prove that $\frac{x}{a} + \frac{y}{b} = 1$ is the equation of a right line, a and b being the distances from the origin at which it intersects the two axes. 3

4. Prove that the formulas for passing from a rectangular to a polar system of co-ordinates, when the polar axis is parallel to the axis of x, are $x = m + r \cos A$, and $y = n + r \sin A$. 4

5. Prove that the polar equation of the circle is $r^2 - 2rr' \cos (A-B) + r'^2 - R^2 = 0$, in which R is the radius of the circle and r' and B the co-ordinates of any point P. 4

6. Prove that the equation of the parabola, referred to its axis and tangent at the principal vertex, is $y^2 = 2px$, p representing the distance from the focus to the directrix. 5

7. Find the points of intersection of the parabola $y^2 = 8x$ and the line $3y - 2x - 8 = 0$. 4

8. Find the equation of a tangent to the ellipse $3y^2 + 2x^2 = 35$ at the point whose abscissa is 2. 4

9. Find the eccentricity of the ellipse $2x^2 + 3y^2 = ^2$. 4

10. Find the transverse and conjugate axes of the hyperbola whose equation is $3y^2 - 2x^2 + 12 = 0$; find also the parameter. 4