APPENDICES

A1 Requirements on the entrance examination to gymnasium

Among available school reports I found only information concerning requirements on the entrance examination to the gymnasium. In the *School Reports from Zbaraż* from 1911, the range of requirements was the following:
- the writing of numbers to the million inclusively;
- proficiency in four operations with integer numbers: certainty in the multiplication table, knowledge of metrical measures.

The insufficient progress in one subject of the examination excludes a pupil for the whole year from being admitted at any secondary school. Strangers are not allowed to enter the room where the examination takes place.
Here is an interesting reference to professor Franciszek Leja's[152] memories. *The holidays of 1895 approached. To get to gymnasium we had to finish the 4th grade of elementary school. The closest 4th class of public school was located in the remote Leżajsk about 8 km from our home*. [...] *After graduating from the 4th class I went with my mother to Jarosław for the entrance exam for gymnasium. We arrived there the day before the exam and stayed for the night in the monastery of the Capuchins. In the same monastery another candidate for the school with his father stayed too. His father was an organist and came from the area of Jarosław. In the evening, during a talk with my mother the father began to question his son and me on the test material to check our preparation.*

A2 Examples of the tasks from maturity examination

The final school examination took place in two parts, in the written and oral forms. Students usually had to solve three problem exercises, from the range of the arithmetic, equations, geometry and foundations of the economy. The oral part was administered after the written part, after affirmative evaluation of which the pupil got the secondary school certificate; if instead he did not pass this part, he could retake one subject after holidays.

Problems in the written part of final school examination at the classical gymnasium

According to the School Management Reports of c.k. Gymnasium named after Franz Josef in Lvov, since 1877 problems in the written part of final school

[152] See: F. Leja, *Dawniej było inaczej* [It was diffrent in the old days].

examination were published. Among other things there were maturity exam problems from mathematics for department A and B (later I, II, III). They were systematically published till 1902. Then there was a year-long break and then publication was renewed, continuing to 1907. From 1908 to 1921 in the management reports, the problems to written school-leaving examination were not published.

A

Solve the equation:

$$x^2 + x(a+b)(a-b) + a^2\sqrt{a+b} = -\sqrt{a+b}(x+b^2).$$

A ball of the volume is $275768 \cdot 9$ cubic cm is intersected with a plane. What is the distance from the centre of the ball to the plane, if its perimeter equals $1769 \cdot 5$ cm?

After how many years 7548 zł. remaining on the compound interest at 6 and ¾, at the end of each year reduced by 547 zł., will decrease to the sum 2450 zł.?

B

Solve the following equation:

$$\sqrt{2+5\sqrt{x-10}} = 1 + 2\sqrt{1-3\sqrt{x-10}}$$

What instalments one should pay at the end of each year, so as to pay off a 4568 zł. debt lent at 6 1/2 % in 12 years ?

A ball is intersected by a plane, the intersection is a circle; find its radius, its distance to the centre of the ball and its area, if the radius of the ball is 25 m. and if the angle between the radius of the ball and the perpendicular line to the plane issued from the centre of the ball is $37^0 25'42''$.

1878

a) A Solve the following equation:

$$5\sqrt{x+7} + \frac{3x+1}{\sqrt{x+7}} = 3\sqrt{8x}$$

b) What is the difference between the area of the inscribed and circumscribed circle, and the area of the regular octagon whose side equals $12 \cdot 4$ cm?
c) What funds we will receive, if at half-yearly capitalization of 6% , we invest 210 zł for 18 years at the end of every half-year?

B

a) Solve the following equation of two unknowns:

$$\begin{cases} y = -\sqrt{x^2 - y\sqrt{y^2 + 8x}} + x \\ x = \sqrt{x\sqrt{x^2 - 4xy + y\sqrt{16y^2 - x - y + 4}} + y^2} + y \end{cases}$$

b) Draw the lines given by analytical equations
L_1: $y=2x-8$, L_2: $y=x+5$;
compute analytically the angle at which these lines cross, and trigonometrically two remaining angles, and the area of the triangle which is obtained, if starting from the intersection of both lines we will cut off $1837 \cdot 9$ units on L_1 and $1010 \cdot 3$ units on L_2 connecting with a line the ends of these sections?

1880

Solve the equation:

$$\sqrt[x]{6564} - 2\sqrt[2x]{6561} = 3$$

What is one year's installment, if we want to cancel a debt of 16.500 zlotys in installments paid for 20 years at 5% at the end of each year?

What is the volume of a ball whose section at the distance $7 \cdot 8$ cm gives a disc of the area 30 cm^2?

1884

a) To the bank capitalizing every six months at 4½%, I pay 30 zł. monthly since the 1st of January, 1870. How much will I take on the1th of January 1895, and how much will I have paid so far?
b) What is the length of the parallel passing through the Cracow observatory? The latitude is $50^0\,3'\,50''$, the radius of the earth equals $6377 \cdot 4$ km.
c) Given the equation of the circle $x^2+y^2-16=0$ and line $y=2x+5$, find: a) points of their intersection; b) the length of the chord lying between them; c) the chord's equation and d) its distance from the centre of the circle.

1890

Solve the equation:

$$\sqrt{8\sqrt{x}} - 8\sqrt{8\sqrt{x}} + 7 = 0$$

What is the side and the area of the regular dodecagon inscribed in a circle and circumscribed on this circle, if the radius of the circle is $37 \cdot 8$ cm ?

What is the approximate percentage of the population increase, if its number of 117.483 grew up about 14.491 in 11 years?

What is the height and the area of a triangle whose base equals 183 m, and angles at the base equal $71^0\,18'\,10''$ and $60^0\,43'\,8''$?

What instalment will have to be paid at the beginning of each year for 32 years, if one wishes to save 2500 zł. at $7 \cdot 5\%$ of capitalization after this time?

1894

I.

a) Solve the equation:

$$\sqrt{2x+13}+2\sqrt{x-2}=\sqrt{10x+21}$$

b) Compute the area and the volume of the cone, if its side is $124 \cdot 3$ cm and the angle at the vertex is 31° 27’38”.

c) To what sum a fund of 7542 zł. 68 ct. will grow in 18 years at half-year 4¾% capitalization?

II.

a) Solve the equation:

$$\sqrt{x^2-5x-2\cdot 7244}+3\cdot 2\sqrt[4]{x^2-5x-2\cdot 7244}=1\cdot 44$$

b) Looking at two points of a rock, situated vertically one over the other, from the distance 426 m, we see these points at the following angle to the horizontal level: 37° 12’17” and 42° 42’53”; how high does the one point lie over another?

c) What installments, paid at the end of each year, would amortize a loan of 10,000.000 zl. taken for 60 years at 6½% capitalization?

III.

a) Solve the equation:

$$4\left(\frac{1}{x}\right)^{\frac{2}{y}}=11\left(\frac{1}{x}\right)^{\frac{1}{y}}-6$$

$$y=2-\log x$$

b) A cone is circumscribed around a ball of radius $r=15$ cm and the apex angle is $\varphi=71°37’42”$. Calculate the area and the volume of this cone.

c) Every first day of the month a craftsman pays 10 zł. to the savings bank, capitalizing every six months at 4%. How much will he save in 25 years?

1898

a) In a geometrical series the product of the first three terms is 8, and the sum of cubes of these three terms is 73; find the first term and the ratio.

b) The capital $K_1=10240$ crowns is given at per cent 6, and the capital $K_2=15820$ crowns at per cent 4½; after how many years the final values of both capitals will be equal?

c) In an isosceles triangle the perimeter of the triangle is $2s$ and the apex angle is β; find one of equal sides of this triangle and compute it for $2s=231 \cdot 54$ m, $\beta=43°\,15’$.

1899

a) Solve the equation:

$$\frac{x+y}{x-y}-4=5\frac{x-y}{x+y}$$

$$\frac{3\sqrt{x-y}}{x^2}+\frac{2}{x}=\frac{1}{\sqrt{x-y}}$$

b) A regular octahedron inscribed in a sphere is cut out of the iron ball of weight $107 \cdot 44196$ kg. Find its weight, if the density of iron equals $7 \cdot 6$.

c) Solve the triangle and find its area, if the following are given: the difference of two sides $a-c=0 \cdot 75$, the angle opposite to the greater lying side $\alpha=65° \, 34' \, 12 \cdot 6''$ and the height drawn to the third side $h_b=3 \cdot 28$ m.

1904

a) An isosceles triangle and a circle inscribed in it are turned around the height of this triangle; knowing the area P of the body formed by this triangle and the angle α at its apex, deduce the formula for calculation of the volume V of the body formed by the inscribed circle and compute V, if $P=40604\,\text{dm}^2$ and the angle $\alpha=48° \, 12' \, 18''$.

b) Solve the equations:

$$x+y=xy$$

$$\sqrt{x^2+y^2+1}=3xy-10$$

c) A certain person gave 850 K at 5½ per cent, and five years later a capital of 1200 K at the same percentage; after how many years, counting from the moment of putting in the first capital, both capitals will grow to the sum 12800 K?

1906

A

a) The line $2x+y=15$ intersects the circle whose equation is $x^2+y^2=64$. Find the area and the angles of the triangle whose sides are tangent lines at the points of intersection and the chord that joints them.

b) The perpendicular drawn from the vertex of the right angle to the hypotenuse is 4 dm. and creates the angle $\delta=52° \, 43' \, 15''$ with one of the sides containing the right angle. Calculate the volume of the body formed by turning this triangle around the axis passing through the vertex of one of acute angles of the triangle and parallel to the other side containing the right angle of the triangle.

c) Debt of 16500 crowns borrowed at 5½% is paid back during 15 years, 1560 K at the end of each year. How much is left to pay after the payment of 15th instalment?

B

a) In a right triangle, the radius of the inscribed circle ς and perimeter $a+b+c=2s$ is known. Deduce general formulas for the calculation of sides of this triangle and compute the angle α, if $2s=480\,\mathrm{m}$ and $\varsigma=40\,\mathrm{m}$.

b) In a geometric series consisting of 4 terms, the sum of the first and fourth term is 378, and of the second and third term is 90; what is the first term and the constant quotient of this series?

c) Prove analytically that the vertices of all right angles based on the given section a, lie on the perimeter of the circle for which this section is the diameter.

The II State Real School named after Jan and Andrzej Śniadecki in Lvov. Analysing examples of exercises we see that in a real gymnasium class large emphasis was put on the descriptive geometry, because this school was of mathematical and natural science type and educated future engineers.

1905

Group A from mathematics:

a)

$$\sqrt{5\sqrt{x}+5\sqrt{y}}+\sqrt{y+10+\sqrt{x}}$$

$$\sqrt{x^3}+\sqrt{y^3}+35.$$

b) Find geometric locus of the centers of mass of triangles whose common base is a chord of the circle of radius r, lying at a distance d from this centre, and whose opposite vertices are on the perimeter of the circle.

c) Somebody possesses the estate K 240000 which pays the compound interest $p=4\%$. This person spends on his own support a part of the interest, yearly, and adds the rest to the capital. After 20 years the estate of this person equals $K_{20}=285.000$ K. How much did this person spend every year on his own support?

Descriptive geometry:

a) Find the centre of the ball K which touches both the ball K and a plane π at a point A.

b) Given an irregular pentagon in a plane π and point A in the space, find collinearly the section of the pyramid determined by this pentagon and the point A.

c) Find a line passing through two skew lines and intersecting them at right angles.

For the group B:
Mathematics:

a) $$\frac{1}{4}\sqrt{x}+\sqrt{6\sqrt{x+6\sqrt{x}}}=\frac{15}{2}-\frac{1}{4}\sqrt{y}$$
$$x-y=24.$$

b) A smaller circle lies completely inside a greater circle and its perimeter passes through the centre of the greater circle. Determine the conical section which is the geometrical place of the centres of circles which are tangent simultaneously to both circles.
c) A steam-engine costs $a=26700$ K and its yearly maintenance amounts to $b=2400$ K. Every ten years a new machine must be bought. What capital is necessary to buy it and to maintain such machine forever, if we count $p=4\%$?

Problems from the descriptive geometry:
a) A plane oblique to both projective planes is given; in addition given are two points in the space belonging to this plane. Find the projections of the points situated on the given plane whose distance from both given points are equal to given segments. What are possible solutions and under what conditions.
b) Find the proper shadow and the shadow cast on the plane of projection; the shadow cast on the interior of the right and circular cone whose apex lies on the horizontal plane of projections and whose axis is perpendicular to the horizontal plane of projections.
c) Find the projection of points whose distance from the axis of projection x and a given point in space is equal to the given segment. What is a possible solution and under what conditions?

Since 1909 the students got problems only in descriptive geometry and were divided into groups and departments. For every group or department there were separate problems.
Groups A and B:
a) On a straight line *l,* find points equally distant from the vertical plane of projections and from the plane *P* oblique to both planes of projections.
b) A right truncated pyramid whose base is a regular hexagon lying on a horizontal plane of projections, is covered with a square plate; find proper shadows (cast on the planes of projections) and the plate shadow cast on the pyramid.
c) Find tangent planes to an oblique cylinder, and sloping to the horizontal plane of projections at the angle α.

Groups C and D:

a) Given three points in the space situated on the plane oblique to both projective planes of sloping; on the horizontal and vertical planes of projection, find points that are equally distant from 3 given points.
b) Find the section of a cone sloping with respect to an ellipse.
c) Find the absolutely brightest point on the ball surface, under the parallel lighting (the angle of the light rays to the axis x is 45°).

1910

Group I:

a) There is an equilateral triangle which represents at the same time the vertical and horizontal projection of a certain triangle in the space; find the true size of this triangle.
b) On any plane (oblique to both projective planes) find points distant from the axis at a given segment.
c) Find the proper and cast ball shadow under the parallel lighting.

Group II:

a) There are 4 points: O (0, 1, 8), A (–5, 2, 6) B (–1, 4, 4), C (6, 3, 9); the segments OA, OB, OC, represent forces acting on the point O; find the direction and quantity of the resultant.
b) Intersect a cone with the circular directrix along a hyperbola.
c) Intersect a given ball along a circle of given radius.

Group III:

a) Given two oblique lines and a plane; find a line intersecting both skew lines and perpendicular to that plane.
b) There are three generating lines of a cylinder of revolution oblique to both projective planes; find the projections of this cylinder.
c) Given a ball and any line oblique to both projective planes, find a line parallels to the given line and tangents to the ball.

1912

Group I:

a) Given a plane P perpendicular to the projective plane and a line l not lying on this plane; move through the line l planes oblique to the plane P at a given angle.
b) Given two intersecting planes and a line l through these planes, find the ball projections whose centre lies on the line l, and which is tangent to the given planes.
c) Find the rectangular axonometric projection of a given object in perpendicular projections.

Group II:

a) Find the traces of a bisector plane of the angle contained between two oblique planes.
b) Given the projections of any line *m* oblique to both projective plane and traces of a plane *E* intersecting the line *m*, find geometric locus of points of the plane *E* which are distant from the line *m* at a given segment.
c) Find the rectangular axonometric projection of a given object in orthogonal projections.

Group III:

a) Given the traces of the any plane *P*, oblique to both projective planes, and projections of a line *l* lying on this surface, find the projections of the circle inscribed in the triangle: *Ph*, *Pv*, *l*.
b) Find the ball section by the plane passing through the axis *x*, and oblique to the horizontal projective plane at the angle 30°.
c) Find the perspective picture of a given model in rectangular projections (using the method of median projections).

Group IV:

a) Given a plane *P* and a point *A* outside it, find a line through *A* parallel to the plane *P* and oblique to the horizontal projective plane at the given angle.
b) Find the proper and cast shadow of a regular dodecahedron.
c) Given a median projection of a triangle on the plane *P*(*t*, *ź*), oblique to the background at an angle of 45°, find a projection of this triangle onto the background.

1913

Group A:

a) Calculate the true size of the slope angle of any line *l* (oblique with respect to both oblique projective planes) to the plane *P* passing through the axis *x* and a point A in the space (not lying on the line *l*).
b) Find the section of the diagonal cone standing on the horizontal projective plane along a parabola.
c) Find the proper and cast shadow of a ball in the parallel lighting.

Group B:

a) Find the projections of a line through a given point and oblique to both projective planes at given angles.
b) Find the section of an oblique cylinder with the plane perpendicular to its generator and construct the development of this cylinder
c) Find the projections of the circle along which a ball touches a cone circumscribing it from a point *A* lying outside this ball.

And common problems

a) Given traces of an oblique plane *P* and the projections of points *A* and *B* lying on this plane, find the lines passing through the point *A* distant from the point *B* at a given segment m and lying in the plane *P*.

b) Cut a straight cone standing on the horizontal projective plane with an oblique plane along an ellipse and find the development of this cone with transition of the section.
c) Find the rectangular axonometric projection of the given object in rectangular projections (simple pyramid with the square base standing on a square plate) .

1914
In descriptive geometry:
a) Given l: *V* l (0, 3, 0 , 3) and (5, 4, 5, 3) and *m*: *H* (0, 2, 5, 0) *B* (5, 2, 5, 5); find on l points distant from m at the given segment $a = 1, 5$ cm.
b) A regular tetrahedral pyramid stands on the plane *P* (7, 6, 5), *M*' ($x = 2, y = 2, z = ?$) is the horizontal projection of the centre of the base, and *A*' ($x = 0, 5, y = 2, 5, z = ?$) is a horizontal projection of one vertex of the base, the height of the pyramid $h = 6$; find the trace of this solid figure on the plane of projections.
c) Find a ball of the given radius *r* tangent to given two planes and to another given ball.
d) Draw the projections of a regular tetrahedron standing on a plane *P*, obliquely to both oblique projective planes and draw the proper and cast shadow of this polyhedron in the parallel lighting
e) Find tangent planes to a ball, parallel to two given skew lines.
f) Draw in the median perspective the picture of a given model in rectangular projections.

Group A:
a) Cut a straight cone standing on the horizontal projective plane with the plane vertically projecting in the ellipse, find the real size of sections and the development of the cone together with the transition of the section.
b) Find the planes tangent to a ball and parallel to two skew lines.
c) Draw the median projection of the object given in rectangular projections (the right cone placed coaxially on a horizontal square plate)

Group B:
a) Draw the development of an oblique prism whose base is a tetragon lying on the horizontal projecting plane and whose edges are parallel to the perpendicular projective plane.
b) Mark two points on the surface of a ball and find the section of this ball along the circle of the smaller radius passing through these two points.
c) Draw the median projection of a regular octahedron whose axis is parallel to the background.

Group C:

a) Given any oblique plane *P* and a segment *AB* outside *P*, and also oblique to both oblique projective planes; find on the plane *P* a point *C* to form an equilateral triangle with points *A* and *B*.
b) Find the development of an oblique cylinder whose base is a circle lying on the horizontal projective plane and whose directrices are oblique to both projective planes.
c) Find the median projection of an equilateral triangle lying on the given plane oblique to the background.

Group D:

a) Given the projections of rays of light falling on the mirror whose surface is located obliquely to both projective planes, find the projections of the reflected ray.
b) Find the shadow cast inside the niche formed by a half of a straight cylinder standing on the horizontal projective plane and by a quarter of a ball (the parallel lighting).
c) Draw the axonometric dimetric picture of the model given in rectangular projections. (A straight cone standing on a square plate coaxial with it).

1916

In descriptive geometry:

a) *A* plane *P* is given by its traces and a line g by its projections, find the true size of the angle formed by the line g with the plane *P*.
b) The straight pyramid's base is a regular pentagon parallel to the horizontal projective plane, its apex is below the base. Find the cast and proper shadow of this pyramid and, in addition, the shadow cast on this pyramid by a line p whose projections are given.
c) Cut the circular cone standing on the horizontal projective plane along an ellipse.
d) Given a line *l* and points *A* and *B*, pass the plane through the line *l* which divides the segment *AB* in the ratio of 2 to 3.
e) Cut an oblique prism whose base is on the horizontal plane of projections with any plane. Find the proper and cast shadow of the truncated prism and the development of the whole prism with transition of the section.
f) Find the axes and asymptotes of the hyperbola along which the plane, oblique to both planes of projections intersects the given straight cone.

1917

In descriptive geometry:

a) Given projections of two intersecting lines, find the natural size of the angle between these lines.
b) From a point near to a circular cone, pass the planes tangent to this cone.

c) Find the projections of the intersection of a ball with the plane perpendicular to the horizontal plane of projections.
d) Through the line *A P* [*A* (7, 4, 5), *P* (12, 13, 0)] pass the plane *S* oblique to the horizontal plane of projections at the angle $\omega = 60°$ and then in this plane find a line r through the point *A* oblique to the same plane of projections at the angle $\alpha = 45°$. Give the number of possible solutions.
e) Draw the projections of the circular cylinder whose bases have centres S (–3, 5, 5, 4), S_1 (3, 5, 10, 10) and whose side surface passes through the point *A* (–0, 5, 5, 3).
f) Draw the median projection of the regular octahedron, one of whose axes is parallel to the background plane.

A3 List of publications on teaching of mathematics in *Muzeum*

A YEAR'S ISSUE II (Lvov 1886):
1. Wł. Zajączkowski, *Lekcya arytmetyki w klasie I* [A lesson of arithmetic in Form I].
2. S. Dickstein, *Notatka o podzielności liczb* [A note of divisibility of numbers].

A YEAR'S ISSUE IV(Lvov 1888):
1. P. Dziwiński, *O algorytmie x. Tomasza Kłosa* [On Rev. Tomasz Kłos's algorithm].
2. E. Grzębski, *O nauce geometryi wykreślnej w gimnazjach* [On the study of descriptive geometry in gymnasia].
3. Wł. Kretkowski, *O różniczkowaniu pewnych wyrażeń nieskończonych* [On differentiation of some infinite expressions].
4. J. Puzyna, *O tak zwanych miejscach skupienia i ich zastosowaniu w analizie* [On so-called places of accumulation and their application in analysis].
5. A. Giedroyć (teacher from Tarnopol), *Wskazówki dla początkującego do ustawienia równań* [Beginner's guide to setting up equations].
6. M. Rembacz (teacher from Stanisławów):
   a) *Przyczynek do Apolloniusowych zagadnień styczności* [Contribution to Apollonius' adjacency issues],
   b) *Nowy sposób wykreślania kąta nachylenia dwu płaszczyzn w rzutach prostokątnych* [New metod of graphing the angle between two planes in rectangular projections].
7. P. Dziwiński, *Ruch naukowy w dziedzinie nauk matematycznych* [The scientific movement in the field of mathematical sciences].
8. W. G. Zbierzchowski (a teacher from Jarosław), *O liczbie kierunkowej w nauce matematyki w szkole średniej* [Directional numbers in teaching mathematics in high school].

A YEAR'S ISSUE V (Lvov 1889):

1. Review of textbook: *Pidruchnyk matematyky dlia I klasu serednioyi shkoly* [Textbook of mathematics for the 1st form of high school].
2. *Prace Matematyczno-Fizyczne, Warszawa 1888 (wydawane przez S. Dicksteina, Wł. Gosiewskiego, Ed. i Wł. Natansonów), informacja o treści* [Works in Mathematics and Physics, edited by S. Dickstein, W. Gosiewski and Ed. and Wl. Natanson; information about content].
3. *Geometrya wykreślna w gimnazjach* (wiadomości zakresu szkoły i nauczania) [Descriptive geometry in gymnasiums (information about school program and teaching)].

A YEAR'S ISSUE VII (Lvov 1891):

1. M. Rembacz, *Geometrya wykreślna jako przedmiot egzaminu dojrzałości w szkołach realnych* [Descriptive geometry as a subject of final school examination in the real schools].
2. A review of the text: P Dziwiński, *Zasady algebry dla gimnazjów i szkół realnych* [Principles of algebra for gymnasia and real schools].

A YEAR'S ISSUE VIII (Lvov 1892):

1. Review of textbook: P. Dziwiński, *Zasady algebry dla wyższych szkół gimnazjów i szkół realnych*, [Princiole of algebra for high schools, gymnasia and real schools], Lvov, 1891.
2. Review of textbook: W. Kozłowski, *Logika elementarna* [Elementary logic], Lvov, 1891.
3. Review of textbook: A. Czajewicz, *Trygonometria płaska i kulista* [Planar andspherical trigonometry], Warsaw, 1891.
4. J. Puzyna, review: J. Korczyński, *Elementarna teoria wyznaczników* [Elementary theory of determinants], 1892.

A YEAR'S ISSUE IX (Lvov 1893):

1. M. Rembacz, *Kilka uwag o nauce rysunków geometrycznych w szkołach realnych ze względu na nowy plan naukowy i wystawę krajową* [Some remarks on the study of geometric drawings with respect to the new study program and the nationwide exhibition].

A YEAR'S ISSUE XI (Lvov 1895):

1. W. Puchewicz, *Liczba i ilość*. *Znaczenie tych słów w języku polskim* [Number and quantity. The meaning of these words in the Polish language].
2. R. Jamrógiewicz, review: M. A. Baraniecki, *Podręcznik algebry dla uczniów klas wyższych* [The textbook in algebra for the students of upper forms], Cracow, 1892.

A YEAR'S ISSUE XV(Lvov 1899):

1. R. Moskwa, *Nasze podręczniki algebry i geometryi w gimnazjum wyższem wobec nowego planu nauki* [Our texts in algebra and geometry in higher gymnasium with respect to the new study program].
2. Jakubowski, Zadurowicz, review: M. Jamrógiewicz, *Geometrya poglądowa dla niższych klas gimnazjów* [Visual geometry for lower forms of gymnasium], Lvov, 1897.

A YEAR'S ISSUE XVI (Lvov 1900):

1. K. E. Ljon, review: I. Kranz, *Tablice pięciocyfrowe logarytmów liczbowych i funkcyj trygonometrycznych* [Five-digit tables of numerical logarithms and trigonometric functions], Cracow, 1900.

A YEAR'S ISSUE XVII (Lvov 1901):

1. R. Jamrógiewicz, review: K. Brzostowicz, *Początki arytmetyki i algebry dla niższych klas szkół średnich* [Beginnings of arithmetic and algebra for lower forms of high schools].
2. J. Rajewski, review: E. Poznański, *Pierwiastki pierwotne liczb pierwszych* [Primitive roots of prime numbers].

A YEAR'S ISSUE XVIII (Lvov 1902):

1. review: I. Kranz, *Zbiór zadań matematycznych* [A collection of problems in mathematics], Cracow, 1902.

A YEAR'S ISSUE XIX(Lvov 1903):

1. Roman Jamrógiewicz, *Krótki szkic metodycznej lekcyi o logarytmach* [A brief outline of a methodical lesson on logarithms].
2. W. Wasilkowski, *Znaczenie geometryczne trzeciej potęgi dwumianu* [Geometric meaning of the third binomial power].
3. R. Jamrógiewicz, review: J. Kostecki, *Algebra dla wyższych klas szkół średnich* [algebra for upper forms of the high school].

A YEAR'S ISSUE XX (Lvov 1904):

1. W. Frank, *Kilka uwag krytycznych odnoszących się do rozpraw p. R. Jamrógiewicza umieszczonych w „Muzeum" r. 1903* [Some critical remarks concerning the essays by Mr. R. Jamrogiewicz published in *Muzeum*, y. 1903].

A YEAR'S ISSUE XXI (Lvov 1905):

1. K. Czajkowski, *O mnożeniu. Z powodu artykułów o mnożeniu i logarytmowaniu prof. R. Jamrógiewicza* [On multiplication. Prompted by articles on multiplication and logarithms by Prof. R. Jamrogiewicz.].

2. R. Jamrógiewicz, review: I. Kranz, *Arytmetyka i algebra dla niższych klas szkół średnich cz. I, II* [Arithmetic and algebra for lower forms of the high school, parts I, II].

A YEAR'S ISSUE XXII vol. 1 (Lvov 1906):

1. A. Łomnicki, *Wstępne lekcyje trygonometryi* [Initial lessons in trigonometry].

A YEAR'S ISSUE XXIII vol. 2 (Lvov 1906):

1. Ł. Böttcher, *Kilka uwag w sprawie reformy nauczania matematyki w szkołach średnich* [A few remarks concerning reforming of studying mathematics in high schools].
2. Kazimierz Strutyński, review: I. Badowski, *Geometrya elementarna – podręcznik dla szkół średnich*, [Elementary Geometry – a secondary school textbook], 2nd edition, Warsaw.
3. Review: S. Dickstein, *Arytmetyka w zadaniach cz. I, II* [Arithmetics in problems, parts I, II], Warsaw, 1906.
4. K. Strutyński, review: A.Faihofer, *Pierwsze początki geometryi* [The first elements of geometry].
5. K. Strutyński, review: Z. Gabszewicz, *Trygonometrya. Podręcznik dla kształcących się w zakresie kursu szkół średnich* [Trigonometry. Handbook for trainees in the course of secondary schools].
6. W. Rembacz, review: I. Kranz, *Geometrya poglądowa. Podręcznik dla wyższych klas szkół średnich cz. I* [Visual geometry. Guide for upper forms of secondary schools. Part I], Cracow, 1907.
7. A. Hoborski, review: J. Todhunter, *Algebra początkowa* [Elementary algebra].

A YEAR'S ISSUE XXIV vol. 1 (Lvov 1908):

1. A. Hoborski, review: S. Zaremba, *Zarys pierwszych zasad teorii liczb całkowitych*, [An outline of first principles of integers], Cracow, 1907,
2. R. Jamrógiewicz, review: K. Kędzierski, *Wykłady arytmetyki z zadaniami. Liczby całkowite* [Lectures on arithmetic with problems. Integers.], Warszawa, 1907.
3. R. Jamrógiewicz, review: K. Grochowski, *Zbiór zadań arytmetycznych cz. I* [A collection of problems in arithmetic, part I], Warszawa, 1907.

A YEAR'S ISSUE XXIV vol. 2 (Lvov 1908):

1. J. Mihułowicz, review: I. Kranz, *Geometrya poglądowa, podręcznik dla niższych klas szkół średnich, cz. I–II* [Visual geometry – a secondary school textbook], Cracow, 1907, 1908.
2. K. Strutyński, review: A. Cehak*, Elementarna nauka form geometrycznych dla I kl. szkoły realnej* [Elementary study of geometrical shapes for Form I of real schools], Stanisławów, 1908.

3. R. Jamrógiewicz, review: M. Feldblum, *Algebra elementarna* [Elementary algebra], Warszawa–Łódź, 1907.
4. K. Strutyński, review: W.E. Wierzbicki, *O liczbach André'go i ich związku z liczbami Bernouli'ego i Eulera. Część I.* [On André's numbers and their relations to Bernoulli's and Euler's numbers. Part I], Report of II Real School in Lvov for the school year 1907/1908.

A YEAR'S ISSUE XXV vol. 1 (Lvov 1909):
1. L. Wołowicz, review: W. Rembacz, *Znaczenie nauki geometryi wykreślnej w programie wykształcenia ogólnego* [The significance of the study of descriptive geometry in the program of general education], Sprawozdanie Dyrekcji II Szkoły Realnej we Lwowie za rok 1908.
2. L. Wołowicz, review: J. Dal-Trozzo, *Zadania geometryczne, Cz. I. Planimetria* [Problems in geometry, Part I: Planimetry], Warszawa, 1908.
3. R. Jamrógiewicz, review: P. Dziwiński, *Podręcznik arytmetyki i algebry dla wyższych klas szkół średnich. Trzecie przerobione wydanie "Zasad algebry"* [Textbook in arithmetic and algebra for upper forms of high school. Third revised edition of "Principles of algebra"], Lvov, 1907.
4. K. Czajkowski, review: I. Kranz, *Geometrya poglądowa*. Część II [Visual geometry. Part II], Cracow, 1908.

A YEAR'S ISSUE XXV vol. 2 (Lvov 1909):
1. A. Wilk, review: Ł. Böttcher, *Zasady geometryi elementarnej dla szkół z licznemi ćwiczeniami* [Principles of elementary geometry with numerous exercises], Warszawa, 1908.

A YEAR'S ISSUE XXVI vol. 1 (Lvov 1910):
1. J. Pannenko, *Uwagi o nauczaniu matematyki w szkole średniej* [Remarks on teaching mathematics in high school].
2. A. Łomnicki, review: A. Hoborski, A Wilk, *Zasadnicze pojęcie rachunku różniczkowego i całkowego* [Basic notion of differential and integral calculus], Cracow, 1910.

A YEAR'S ISSUE XXVI vol. 2 (Lvov 1910):
1. A. Łomnicki, review: W. Sierpiński, *Teorya liczb niewymiernych*. *Wykłady uniwersyteckie* [Theory of irrational numbers. University lectures], Warsaw, 1910.
2. A. Hoborski, review: J. Ralski, *Zasady rachunku różniczkowego i całkowego dla użytku szkół średnich* [Rules of differential and integral calculus for the use at secondary schools], Reports of Management of the imperial High Real School in Jarosław in 1909/10 school year.

3. A. Hoborski, review: Jan Sitnicki, *Elementarne pojęcia rachunku różniczkowego i całkowego* [Basic notions of differential and interal calculus], Management Reports of High Real School in Tarnopol for 1909/10 school year.

A YEAR'S ISSUE XXVII vol. 2 (Lvov 1911):

1. M. Hrycak, *Nowe podręczniki geometryi dla klasy I. Kilka uwag o nauczaniu geometryi poglądowej* [New textbooks in geometry for Form I. Some remarks on teaching visual geometry].
2. J. Ralski, *Odpowiedź na recenzję rozprawy: "Zasady rachunku różniczkowego i całkowego dla użytku szkół średnich"* [Answer to the review of the essay "Rules of differential and integral calculus for the use at secondary schools"].
3. M. Hrycak, review: R. Jamrógiewicz, K. Strutyński, *Geometrya poglądowa* [Visual geometry].
4. W. Arvay, *Jak prowadzić naukę o funkcjach w naszych gimnazjach* [How to direct the study of functions in our gymnasia].

A YEAR'S ISSUE XXVIII vol. 1 (Lvov 1912)

1. S. Zabielski, review: A. Łomnicki, *Geometrya. Podręcznik dla szkół średnich cz. I, II: Planimetrya, Stereometrya* [Geometry. Textbook for secondary schools. Part I. Part II.].

A YEAR'S ISSUE XXVIII vol. 2 (Lvov 1912):

1. Józef Sprecher, review: W. Frank, *Początki arytmetyki ogólnej i algebry dla klasy III szkół średnich* [Beginnings of general arithmetics and algebra for Form III of high schools].

A YEAR'S ISSUE XXIX vol. 1 (Lvov 1913):

1. review: A. E. H. Love, *Zasady rachunku różniczkowego i całkowego* [Rules of differential and integral calculus].

A YEAR'S ISSUE XXIX vol. 2 (Lvov 1913):

1. J. Sprecher, review: R. Suppantschitsch, *Zarys geometryi dla klasy trzeciej gimnazjów, gimnazjów realnych i szkół średnich* [Outline of geometry for Form III of gymnasium, real gymnasium and high school].
2. A. Hoborski, *Kilka uwag o nauczaniu rachunku prawdopodobieństwa w szkole średniej* [Somem remarks on teaching calculus of probability in high school].
3. A. Łomnicki, review: W. Frank, *Arytmetyka dla I i II klas szkół średnich* [Arithmetic for Form I and II of high school].

A YEAR'S ISSUE XXXI (Lvov 1916):

1. 1. S. Zabielski, review: K. Strutyński, *Arytmetyka dla szkół średnich. Stopień wyższy* [Arithmetic for high schools. Upper level].

A YEAR'S ISSUE XXXII (Lvov 1917):

1. 1. A. Łomnicki, review: F. Enriques, U. Amaldi, *Zasady geometryi elementarnej do użytku szkół średnich* [Principles of elementary geometry for theuse of high schools].

A YEAR'S ISSUE XXXIII (Lvov 1918):

1. 1. J. Mihułowicz, review: Lucjan Zarzecki, *Nauczanie rachunku początkowego* [Teaching of beginning calculus]

A4 Composition of the Philosophical Faculty of the c.k. Emperor Francis I University in Lvov based on the composition of staff (1881/82 and 1905/06)

1881/1882 (summer term)
Faculty of Philosophy

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Wawrzyniec Żmurko
Teofil Ciesielski
Zygmunt Węclewski
Dr Xawery Liske
Szczęsny Kreutz
Dr Tomasz Stanecki
Dr Izydor Szaraniewicz
Bronisław Radziszewski
Roman Pilat
Ludwik Ćwikliński
Oskar Fabian

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Franciszek Kamieński

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DEPUTY PROFESSOR: August Sauer

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Dr Julian Ochorowicz
Dr Franciszek Kamieński
Antoni Kalina
Ignacy Skrochowski
Julian Niedźwiedzki
Władysław Zajączkowski
Władysław Kretkowski
Mieczysław Dunin Wąsowicz

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Jan Amborski
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THE SECRETARY AND NOTARY: Dr Stanisław Szachowski
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THE CLERK: Ananiasz Ardan
PERMANENT CLERK WORKING PER DIEM (a person who receives pay on a daily basis): Franciszek Owoc

1884/1885(winter term)
Faculty of Philosophy

c.k. PROFESSORS STAFF
DEAN AND CHAIRMAN: Dr Oskar Fabian (Senat akademicki – academic Senate)

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Teofil Ciesielski
Dr Zygmunt Węclewski

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1905/1906 (summer term)
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Kazimierz Twardowski
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A5 Mathematics at the General Department of the Mining Faculty at the c.k. Polytechnic School

SCHOOL YEAR	YEAR	SUBJECT	WEEKLY NUMBER OF HOURS IN A TERM						LECTURER
			WINTER TERM			SUMMER TERM			
			W	Ć	R	W	Ć	R	
1885/86	I	Mathematics course I	6	3	–	6	3	–	Vacancy
		Descriptive geometry	6	–	12	6	–	12	Karol Maszkowski
1886/87	I	Mathematics course I	6	3	–	6	3	–	Władysław Zajączkowski
		Descriptive geometry	6	–	12	6	–	12	Karol Maszkowski
1887/88	I	Mathematics course I	6	3	–	6	3	–	dr Placyd Dziwinski
		Descriptive geometry	6	–	12	6	–	12	dr Mieczysław Łazarski
1888/89	I	Mathematics course I	6	3	–	6	3	–	dr Władysław Zajączkowski
		Descriptive geometry	6	–	12	6	–	12	dr Mieczysław Łazarski
	II	Mathematics course II	5	–	–	5	2	–	dr Placyd Dziwiński
1890/91	I	Mathematics course I	6	3	–	6	3	–	dr Władysław Zajączkowski
	II	Descriptive geometry	6	–	12	6	–	12	dr Mieczysław Łazarski
		Mathematics course II	5	–	–	5	2	–	dr Placyd Dziwiński

1891/92	I	Mathematics course I	6	3	–	6	3	–	dr Władysław Zajączkowski
		Descriptive geometry	6	–	12	6	–	12	dr Mieczysław Łazarski
1892/93	I	Mathematics course I	6	–	–	6	–	–	dr Władysław Zajączkowski
		Descriptive geometry	5	–	10	5	–	10	dr Mieczysław Łazarski
1893/94	I	Mathematics course I	6	–	–	6	–	–	dr Placyd Dziwiński
		Descriptive geometry	5	–	10	5	–	10	dr Mieczysław Łazarski
1894/95	I	Mathematics course I	6	–	–	6	–	–	dr Władysław Zajączkowski
		Descriptive geometry	5	–	10	5	–	10	dr Mieczysław Łazarski
1895/96	I	Mathematics course I	6	–	–	6	–	–	dr Placyd Dziwiński
		Descriptive geometry	5	–	10	5	–	10	dr Mieczysław Łazarski
1896/97	I	Mathematics course I	6	–	–	6	–	–	dr Władysław Zajączkowski
		Descriptive geometry	5	–	–	5	–	–	dr Mieczysław Łazarski
		Drawings in descriptive geometry	–	–	10	–	–	10	dr Mieczysław Łazarski
1897/98	I	Mathematics course I	6	–	–	6	–	–	dr Placyd Dziwiński
		Descriptive geometry	5	–	–	5	–	–	dr Mieczysław Łazarski
		Drawings in descriptive geometry	–	–	10	–	–	10	dr Mieczysław Łazarski
1898/99	I	Mathematics course I	5	–	–	5	–	–	dr Władysław Zajączkowski
		Descriptive geometry	4	–	–	4	–	–	dr Mieczysław Łazarski
		Drawings in descriptive geometry	–	–	6	–	–	6	dr Mieczysław Łazarski
1899/00	I	Mathematics course I	5	–	–	5	–	–	dr Placyd Dziwiński
		Descriptive geometry	4	–	–	4	–	–	dr Mieczysław Łazarski

1899/00	I	Drawings in descriptive geometry	–	–	6	–	–	6	dr Mieczysław Łazarski
1902/03	I	Mathematics course I	5	–	–	5	–	–	dr Stanisław Kępiński
		Descriptive geometry	5	–	–	3	–	–	dr Mieczysław Łazarski
		Drawings in descriptive geometry	–	–	6	–	–	6	dr Mieczysław Łazarski
1909/10	I	Elements of higher mathematics	4	–	–	4	–	–	Adam Maksymowicz
		Descriptive geometry	5	–	3	5	–	3	dr Mieczysław Łazarski
1911/12	I	Elements of higher mathematics	4			4			dr Adam Maksymowicz
		Descriptive geometry	4			4			dr Kazimierz Bartel
		Drawings in descriptive geometry	3			3			dr Kazimierz Bartel
		Exercises in descriptive geometry	2			2			dr Kazimierz Bartel
	II	Insurance mathematics	1,5			–			Antoni Pawłowski
1913/14	I	Elements of higher mathematics	4			4			dr Adam Maksymowicz
		Exercises of the elements of higher mathematics	2			1			dr Adam Maksymowicz
		Descriptive geometry B	4			4			dr Kazimierz Bartel
		Drawings in descriptive geometry	3			3			dr Kazimierz Bartel
		Exercises in descriptive geometry	2			2			dr Kazimierz Bartel
	II	Insurance mathematics	1,5			–			Antoni Pawłowski

Mathematical contents of the subjects: Mathematics course I, Descriptive geometry, Elements of higher mathematics, practical exercises in the construction of the descriptive geometry are the same as in the Engineering Department (compare Chapter III).

A new subject appeared: Insurance mathematics

The subject appeared in the teaching programme in 1910/11, was compulsory till 1913/14, and was the following:

The most necessary information from the complex calculus and the probability. Tables of mortality and their mathematical basis. The insurance rules dependable on the life or death of one person; annuity life insurance and endowment capital or in case of death, on the basis of one input and annual bonuses, bonus reserve. Gross premiums or quotas.

It was taught by **Antoni Pawłowski** (1859–1942). He was born on October 13, 1859 in Witkowo in Bukovina. He finished gymnasium in Czerniowce. Between 1878–1881, he studied mathematics at the University of Czernivtsi, then economics at the University of Vienna and the local academy of Foreign Trade. In I884–1899 he worked in gymnasia. Then, in 1899–1919 he was the director of School of Economics in Lvov and head of the Department of Vocational Education in Lvov Educational Board. In 1913 he was an associate professor of insurance mathematics in the Lvov Polytechnic, which he left in 1922. School of Foreign Trade in Lvov (later the Academy of Foreign Trade) was founded at his initiative, he was its rector. In 1922–1937 he headed there the Chair of political and commercial arithmetic. After retiring in 1937 he still taught commercial and political arithmetic as a honorary professor. He was the author of numerous works on applied mathematics and business. In these books, mainly concerned with the political arithmetic and merchant accounts, many Polish terms were introduced into the field of commercial arithmetic. He died in 1942 in Lvov.

A6 Map of Galicia and Lodomeria

A7 Map of Galiccia and Bukovina

A8 Map of the parliamentary electoral constituencies in 1900

A9 The list of professors mathematics at the Universirty of Lvov In the Autonomy period. This list does not contain Privatdozents and assistant professsors