

The University of the State of New York

254TH HIGH SCHOOL EXAMINATION

PLANE GEOMETRY

Wednesday, June 22, 1932—9.15 a. m. to 12.15 p. m., only

Instructions

Do not open this sheet until the signal is given.

Answer all questions in part I; in part II, answer three questions from group I and two questions from group II.

Part I is to be done first and the maximum time to be allowed for this part is one and one half hours. Merely place the answer to each question in the space provided; no work need be shown.

If you finish part I before the signal to stop is given you may begin part II. However, it is advisable to look your work over carefully before proceeding to part II, since no credit will be given any answer in part I which is not correct and in its simplest form.

When the signal to stop is given at the close of the one and one half hour period, work on part I must cease and this sheet of the question paper must be detached. The sheets will then be collected and you should continue with the remainder of the examination.

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Wednesday, June 22, 1932

Fill in the following lines:

Name of school.....Name of pupil.....

Detach this sheet and hand it in at the close of the one and one half hour period.

Part I

Answer all questions in this part. Each correct answer will receive $2\frac{1}{2}$ credits. No partial credit will be allowed. Each answer must be reduced to its simplest form.

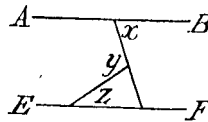
Directions (questions 1-18) — Write on the dotted line at the right of each question the expression which when inserted in the corresponding blank will make the statement true.

1 In a triangle the line from a vertex perpendicular to the opposite side, extended if necessary, is called the *Ans.*.....

2 If two sides of a triangle are unequal, the angle opposite the longer side is . . . than the angle opposite the shorter side. *Ans.*.....

3 If the bisector of an angle of a triangle is perpendicular to the opposite side, the two triangles formed can be proved congruent by *one* of the three methods, (a) *s a s*, (b) *a s a* or (c) *s s s*; the method used in this case is [Answer *a* or *b* or *c*.] *Ans.*.....

4 AB is parallel to EF , angle $x = 68^\circ$ and angle $y = 103^\circ$; the number of degrees in angle z is



Ans......

5 If the diagonals of a parallelogram are equal, the figure is a *Ans.*.....

6 If two unequal circles have the same center, all chords of the larger circle that are tangent to the smaller circle are *Ans.*.....

7 Two tangents to a circle from an outside point P touch the circle at A and B and arc $AB = 100^\circ$; the number of degrees in angle APB is *Ans.*.....

8 To inscribe a circle in a triangle, it is necessary to bisect two of the . . . of the triangle. *Ans.*.....

9 The locus of the middle points of all radii of a given circle is a *Ans.*.....

10 On a map Wyoming is represented by a rectangle 7 inches long and $5\frac{1}{2}$ inches wide. If the length of Wyoming is 350 miles, its width is *Ans.*.....

11 A surveyor measures a distance of 30 feet from A to C along a road. Then with his tape he locates in a field a point B 50 feet from A and 40 feet from C . The number of degrees in angle ACB is *Ans.*.....

12 Two adjacent sides of a parallelogram are 10 and 20 and their included angle is 31° . The altitude on side 20 found by using the tables is *Ans.*.....

13 The number of degrees in the angle whose sine is .9523 is [Find answer correct to the nearest degree.] *Ans.*.....

14 The number of degrees in each angle of a regular polygon having twelve sides is *Ans.*.....

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Write at top of first page of answer paper (a) name of school where you have studied, (b) number of weeks and recitations a week in plane geometry.
The minimum time requirement is five recitations a week for a school year.
Name the author of the textbook you have used in plane geometry.

Part II

Answer five questions from part II, including three questions from group I and two questions from group II.

Group I

Answer three questions from this group.

- 21 Prove that if from a point outside a circle a tangent and a secant are drawn to the circle, the tangent is the mean proportional between the secant and its external segment. [10]
- 22 a State two theorems used in proving the following theorem: If the diagonals of a quadrilateral bisect each other, the figure is a parallelogram. [5]
b State another theorem used in proving one of the two theorems given in answer to a. [5]
[Do not write a proof of any of these theorems.]
- 23 In the regular pentagon $ABCDE$, prove that diagonals AC and BD are equal. [10]
- 24 The longer base of a trapezoid gradually decreases until it becomes zero, but the other base and the altitude remain unchanged.
a Does the area increase or decrease? [2]
b When the longer base has decreased to the length of the shorter base, what figure has the trapezoid become? [2]
c Show how the formula for the area of the figure in b can be obtained from the formula for the area of the trapezoid. [2]
d When the longer base has decreased to zero, what figure has the trapezoid become? [2]
e Show how the formula for the area of the figure in d can be obtained from the formula for the area of the trapezoid. [2]
- 25 Construct the locus of points equidistant from two given intersecting lines and on this locus construct all points at a given distance from the intersection of the two given lines. [6, 4]

Group II

Answer two questions from this group.

Leave all work on the paper; merely writing the answers is not sufficient. Irrational results may be left in the form of π and radicals unless otherwise stated.

- 26 Two piers (supports) of a bridge in the form of a circular arch are 240 feet apart, and the highest point of the arch is 30 feet higher than the piers; find the radius of the arch. [10]
- 27 A square $EFGH$ is inscribed in another square $ABCD$ so that E is on AB , F on BC , G on CD and H on DA , and angle AHE is 30° . The area of $EFGH$ is 100; find a side of $ABCD$. [10]
- 28 A circle whose radius is 10 is tangent to both sides of a right angle. Find to the nearest tenth the area bounded by the two straight lines and the minor arc of the circle. [10]
Use $\pi = 3.14$