these triangles as being formed of bands $\frac{1}{8}$ inch wide, and make these bands interlace. [10]

(*b*) Draw two horizontal lines, each 4 inches long and 2 inches apart. Divide the space between them into contiguous equilateral triangles. Use these lines and triangles as the basis of a design for a border suitable for a wall paper. [25]

ALGEBRA.

Examiner—J. C. Glashan.

Value for each question = 10.

1. Divide $\left(\dfrac{x^{3}}{a^{2}}+\dfrac{a^{2}}{x^{2}}-2\right)^{2}$

by $\dfrac{a}{x}-\dfrac{x}{a}$. *Ans.* $\left(\dfrac{a}{x}-\dfrac{x}{a}\right)^{2}$.

2. Simplify

$$\frac{1}{4\,(x-1)}-\frac{1}{4\,(x+1)}+\frac{1}{(x-1)^{2}\,(x+1)}.$$

Ans. $\dfrac{1}{2(x-1)^{2}}$.

3. Simplify

$$\left(\frac{x+y}{x-y}-\frac{x-y}{x+y}\right)\div\left(\frac{x^{2}+y^{2}}{x^{2}-y^{2}}-\frac{x^{2}-y^{2}}{x^{2}+y^{2}}\right).$$

Ans. $\dfrac{x^{2}+y^{2}}{xy}$.

4. Prove that

$$\frac{a+b}{ab}\left(\frac{1}{a}-\frac{1}{b}\right)-\frac{b+c}{bc}\left(\frac{1}{c}-\frac{1}{b}\right)$$

$-\dfrac{c-e}{ce}\left(\dfrac{1}{c}+\dfrac{1}{e}\right)$ is the difference of two squares.

5. Resolve into linear factors
$$(a^{2}+bc+ca+ab)(b^{2}+ca+ab+bc)$$
$(c^{2}+ab+bc+ca).$
Ans. $(a+b)^{2}(a+c)^{2}(b+c)^{2}$.

6. Resolve into three factors
$(x+y)^{2}(x^{2}+z^{2})-(x+z)^{2}(x^{2}+y^{2}).$
Ans. $2x(x^{2}-yz)(y-z)$.

7. Show that there is only one value of x that will make $x^{3}+6x^{2}c+8xc^{2}+10c^{3}$ equal to the cube of $x+2c$, and find that value.
Ans. $x^{3}+6cx^{2}+8c^{2}x+10c^{3}=(x+2c)^{3}$;

i.e., $x=\dfrac{c}{2}$.

8. Solve the equation
$$\frac{x-1}{x-2}-\frac{x-2}{x-3}=\frac{x-5}{x-6}-\frac{x-6}{x-7}.$$
Ans. $x=4\frac{1}{2}$.

9. Solve the simultaneous equations
$$\frac{2x-y}{1}=\frac{2y-z}{2}=\frac{2z-u}{4}=\frac{2u-x}{8}=15.$$
Ans. $x=32,\ y=49,\ z=68,\ u=76$.

10. Find a number less than 100, the sum of whose digits is 12, and whose digits if reversed form a number which is greater by 6 than half of the original number.
Ans. 84.

EUCLID.

Examiner—J. Dearness.

NOTE —Contractions, and symbols except of operation, may be employed. Use capital letters on the diagrams. It is recommended that every step in the demonstration should begin on a new line, and references and authorities be placed opposite in the margin.

1. Wherein, if at all, are the following definitions incomplete :
An acute angled triangle is that which has two acute angles. [2]
A parallelogram is a rectilineal figure whose opposite sides are parallel. [2]
Parallel straight lines are such as being produced ever so far do not meet. [3]

2. Distinguish between a rhombus and a square. What parallelograms are not rectangles? Illustrate by diagrams. [5]

3. The angles which one straight line makes with another upon the same side of it are together equal to two right angles. [8]
What is a corollary? Give an example and demonstrate it. [7]
AB makes two unequal angles upon one side of CD ; show that the bisectors of these two angles are perpendicular to each other. [7]

4. Two triangles have two angles of the one equal to two angles of the other each to each and the side adjacent to the equal angles in one triangle equal to the corresponding side of the other. Show that the two triangles are equal in every respect. [9]
Through a given point draw a straight line which shall form with two given inter-