

7. Narrate briefly the principal events that occurred under the Commonwealth.
8. How did England acquire Cape Colony, Ceylon, Malta, and Mauritius?
9. Name some of the principal literary men of the reign of George III., and briefly indicate the works which have done most to render them famous.
10. Mention the chief engagements, on sea and on land, that took place during the war between England and France from 1803 to 1815. In each case give the names of the commanders of the forces engaged, and state the issue of the engagement.

*Algebra.—Optional for Class D and Junior Civil Service. Time allowed: 3 hours.*

1. If  $x = \frac{1}{2}$ ,  $y = 0$ ,  $z = -\frac{2}{3}$ , find the numerical value of  $x^2 - yz + \frac{z^2 - xz}{z^2 - y^2}$ .
2. Multiply  $2x^2 + 4y^2 - 3xy$  by  $xy - 2y^2 - 5x^2$ , arranging your answer in descending powers of  $x$ . Find the remainder when the preceding product is divided by  $xy - 4y^2 + 2x^2$ .
3. Resolve into elementary factors  $x^4 - 16y^4$ ;  $15a^2 + 14ab - 8b^2$ ;  $(3a - 2b + c)^2 - (2a + b - 3c)^2$ ;  $x^6 - y^6$ ;  $x^2 - y^2 + z^2 - 2xz$ .
4. Simplify  $3(2a - 3b) - 2[a - (-2a + b) + 3\{-2a + b - (a - b)\} - 4b]$  and  $\frac{1}{2}(2a - b) - \frac{1}{3}\{-2a - \frac{b - a}{2}\}$ .
5. Find the highest common divisor of  $6x^4 - x^3y - 3x^2y^2 + 3xy^3 - y^4$  and  $15x^4 - 4x^3y - 8x^2y^2 + 8xy^3 - 3y^4$ .
6. Simplify the fractions—

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

$$\frac{1}{a^2 + b^2} \times \frac{\frac{a^2}{b} - b^2}{\frac{1}{a} - \frac{1}{b}} - \frac{1}{a^2 - b^2} \times \frac{\frac{a^2}{b} + b}{\frac{1}{a} + \frac{1}{b}}.$$

7. Solve the equations—

$$\frac{4x - 12}{11} - \frac{1}{2}\left(\frac{x + \frac{1}{2}}{5}\right) = \frac{7 + x}{3} - 1\frac{7}{12}.$$

$$(ax + b)\left(\frac{x}{a} - \frac{c}{b}\right) = (x + c)(x + 1).$$

8. A rectangular sheet of cardboard, which is  $a$  inches long and  $b$  inches wide, has a square, whose side is  $x$  inches, cut out of each corner, thus allowing the four sides of the sheet to be turned up without rumpling, so as to form a box without a lid. Write down the expression for the cubical content of the box.

9. A merchant buys a cask of brandy for £48, and sells a quantity exceeding three-fourths of the whole by 10 gallons, at a profit of 25 per cent. He afterwards sells the remainder at such a price as to clear 60 per cent. by the whole transaction. Had he sold the whole quantity at the latter price he would have gained 175 per cent. How many gallons were there in the cask?

*Euclid.—Optional for Class D and Junior Civil Service. Time allowed: 3 hours.*

1. What geometrical magnitudes are treated of by Euclid in the First and Second Books? How are these magnitudes compared with one another? What is the ultimate test of the equality of geometrical magnitudes?
2. Define a parallelogram, a rectangle, and a rhombus. Prove that a rhombus is a parallelogram.
3. If one side of a triangle be produced, the exterior angle is greater than either of the interior opposite angles.
4. Prove (preferably by superposition) that two triangles having two angles and the adjacent side of the one respectively equal to two angles and the adjacent side of the other are equal in every respect.
5. Triangles upon equal bases and between the same parallels are equal in area.  
The diagonals AC, BD, of a parallelogram intersect in O, and AP, CP, are drawn to any point P in BD. Show (1) that the triangles APO, CPO, are equal; (2) that the triangles APB, CPD, are together half of the parallelogram.
6. On a given straight line to describe a parallelogram equal to a given rectilineal figure and having an angle equal to a given angle.
7. If a straight line be divided into any two parts, the square on the whole line is equal to the squares on the two parts together with twice the rectangle contained by the parts.
8. To describe a square that shall be equal to a given rectilineal figure.  
The hypotenuse of a right-angled isosceles triangle is 15 inches: find the side of a square equal in area to the triangle.