3. Divide—

$$28x^2 - 43\tfrac{3}{4}y^2 + 140yz - 112z^2, \text{ by } 7x + 8\tfrac{3}{4}y - 14z$$

4. Find the factors of—

$$16x^4 - y^4\,;\; a^2 + b^2 + 2a + 2b + 2ab + 1\,;\; x^3 - 8y^3 - 27z^3 - 18xyz$$

5. Find the H.C.F. of—

$$2a^3x^3 - 7a^2x^2 + 11ax - 15\,;\; 2a^4x^4 - 7a^3x^3 + 8a^2x^2 - 12ax - 9$$

and the L.C.M. of—

$$x^3 - 6x^2 + 11x - 6\,;\; x^3 - 9x^2 + 26x - 24\,;\; x^3 - 8x^2 + 19x - 12$$

6. Simplify—

$$\frac{(y-z)^3 + (z-x)^3 + (x-y)^3}{(x-y)\,(y-z)\,(z-x)}$$

and also—

$$\frac{a^2}{(a-b)(a-c)} + \frac{b^2}{(b-c)(b-a)} + \frac{c^2}{(c-a)(c-b)}$$

7. Solve the equations :—

(i) $\quad \frac{3}{4} - \frac{\frac{3}{4}x + \frac{3}{4}}{\frac{3}{4} + x} = \frac{\frac{3}{4}}{\frac{3}{4} + x} - \frac{3}{4}$

(ii.) $\quad \frac{a^2 - x}{x - 2a} - \frac{2a + x}{a^2 - x} = \frac{a^4}{a^2x + 2ax - 2a^3 - x^2}$

(iii.)
$$\begin{cases} 4x + \dfrac{15 - x}{4} = 2y + 5 + \dfrac{7x + 11}{16} \\ 3y - \dfrac{2x + y}{5} = 2x + \dfrac{2y + 4}{3} \end{cases}$$

8. Two friends, A and B, each intending to visit the other, start from their houses at the same time ; A could reach B's house in m minutes, and B could reach A's house in n minutes : after how many minutes do they meet ?

9. A farmer has enough feed for his oxen to last a certain number of days. If he were to sell 75 oxen, his feed would last 20 days longer ; if, however, he were to buy 100 oxen, his feed would last 15 days less. How many oxen has he, and for how many days has he enough feed ?

10. If, for all values of x,

$$A\,(x + 1)(x - 2) + B\,(x - 2)(x - 3) = C\,(x - 4) + 1$$

Find A, B, C.

11. What relations must exist between p, q, r, s, that

$$x^4 + px^3 + qx^2 + rx + s$$

may be a perfect square ?

Geography.—For Class D. Time allowed : 3 hours.

1. How are latitude and longitude ascertained ? Give the approximate latitude of the following places : London, Cape Maria van Diemen, Athens, Pekin, Invercargill.

2. Explain the phenomena of the trade winds. Is it correct to say "The south-east trade-wind is deflected to the right by the Earth's rotation and becomes the south-west monsoon ?" Why does the monsoon prevail from May to October ?

3. Explain briefly the terms : Cataract, atoll, bar, neap tides, sargasso sea, lagoon, selvas, llanos, pampas, Kuro Siwa, Black Earth Region, Aztecs, Bushmen, Magyars.

4. Draw a map of Africa, marking the position of the three great lakes ; the Congo, Zambesi, Niger, and Nile Rivers ; the Atlas, Cameroon, and Equatorial Mountains ; Capes Guardafui, Palmas, Lagos ; the territories of the British East African and British South African Companies, German West Africa ; Khartum ; Zanzibar ; Sierra Leone ; Stanley Falls ; Algiers.

What are the principal Native races that inhabit Africa ?

5. Give approximately (in millions) the population of the chief countries in Europe and America ; also of New Zealand, India, and Japan.

6. Describe the position of Cairo, Khartum, Monte Video, New Orleans, Barcelona, Fez, Saloniki, Smyrna, Irkutsk, Lhassa, Valetta, Bokhara, Singapore.

7. Through what countries would the projected German through line, from Berlin to the Persian Gulf, pass ? Describe the part already completed.

8. Name in order, going east from the longitude of Greenwich, the countries, seas, and islands that lie on or near the Equator.

9. Give a short account of Siberia, mentioning the chief rivers, lakes, mountain ranges, minerals, towns.

10. Mention the chief ports that would be passed in a coasting voyage from Aden to Hongkong.

Geography.—For Class E, and for Civil Service Junior. Time allowed : 3 hours.

1. Explain the mode of determining the latitude and the longitude of a place. What change takes place in the length of degrees of longitude as one approaches the Poles ?

2. Explain the causes of (*a*) trade winds, (*b*) anti-trades, (*c*) monsoons, (*d*) cyclones.