was in rivers or arms of the sea where the water was smooth, but it was of no use on the ocean or anywhere where the sea was rough. The wood of which the canoe was made was heavy, and the canoe would be so low in the water that a wave of any great size would swamp it at once. To get over this difficulty the Maoris used to bore small holes around the upper part of the canoe, and fasten boards on its sides by means of laces passed through these holes. In this way they formed bulwarks, and so made their canoes pretty safe even in a rough sea. But there was no comfort in them. The canoes could not be kept from leaking, and the men had to bale the water out constantly. On a voyage every one had to work very hard to make the canoe go and keep the water out of her.

Translate the following into English :—

A ka takiri te ata katahi ano ka tukua mai te ngohi o te huka ki uta, katahi ano ka tahuri te Patupaiarehe ki te tango i nga ngohi ki uta, ka eke hoki te kupenga ki uta. Kaore e peneitia tana ika me ta te tangata Maori e tuhaina—he mea huri noa iho ki te tui—me te tui, me te karanga " Tenei po korua mai, ke whakakowatawata te ra " me te tui ano i te ika. Ko Kahukura e tui ana, ko te pona o te tui a Kahukura, he mea titorea te pona, a ka pau te tui te whakaeke ki te ngohi, ka hapainga te tui, e kore e roko hapainga, ka horo ano nga ngohi ki raro, ka tahuri mai ano tera ki te tui, ka haere mai ano ki te pona i te tui a Kahukura, ka mau te pona pahemo rawa ake te kaipona. Te maunga atu ano a Kahukura wetekina ake ano, titoreatia ake ano te tui, ka tui ano, a ka maha, ka hapainga ano e Kahukura, ka warea ano ki te tui, na wai a ka awatea, ka kitea te kanohi o te tangata. Ka kite i a Kahukura, katahi ano ka whati, ka mahue nga ika, ka mahue te kupenga, ka mahue nga waka, ko nga waka he korari. Heoi ano, ka whati tera te Patupaiarehe ki tona kainga, ka mahue te kupenga—ko te kupenga he wiwi. Heoi ano, ka whati tera te Tahurangi—ko te rua tena o nga ingoa o tera Iwi. Katahi ano ka kitea te ta o te kupenga, ka mahue iho te kupenga nei, ka riro mai i a Kahukura hei tauira mana, ka akona e ia ki ana tamariki, na reira i mohio ai nga tapuna o te tangata Maori ki te ta kupenga, a mohio noa nei.

Trigonometry.—For Senior Civil Service. Time allowed: 3 hours.

1. What is indicated in trigonometry by the symbol π?

Find the circular measure of a right angle.

Find the length of arc of a circle of radius one mile subtending an angle $1^\circ\ 15'\ 40''$ at the centre.

2. Express Sin θ in terms of Cot θ, and Cos θ in terms of Cosec θ.

Find the relations between the trigonometrical ratios of $90^\circ + A$ and those of A.

Also find the values of Sin 150°, Cos 225°, and Tan 600°; and write down the general values of $\text{Sin}^{-1}\frac{1}{2}$, $\text{Cos}^{-1}\frac{1}{2}$, and $\text{Tan}^{-1}\frac{1}{\sqrt{3}}$.

3. Establish the following formulæ :—

(a) $\text{Sin}\,(P-Q) = \text{Sin}\,P\,\text{Cos}\,Q - \text{Cos}\,P\,\text{Sin}\,Q$;

(b) $\text{Sin}\,3P = 3\,\text{Sin}\,P - 4\,\text{Sin}^3 P$;

(c) $\text{Sin}\,\frac{A}{2} = \sqrt{\frac{(s-b)(s-c)}{bc}}$;

(d) $\frac{\text{Sin}\,A}{a} = \frac{\text{Sin}\,B}{b} = \frac{\text{Sin}\,C}{c} = \frac{1}{2R}$.

4. Establish the following identities :—

(a) $\frac{1+\text{Sin}\,\theta-\text{Cos}\,\theta}{1+\text{Sin}\,\theta+\text{Cos}\,\theta} = \text{Tan}\,\frac{\theta}{2}$;

(b) $\text{Cos}^2\theta + \text{Cos}^2(\theta+\frac{2\pi}{3}) + \text{Cos}^2(\theta+\frac{4\pi}{3}) = \frac{3}{2}$;

(c) $\text{Cot}^{-1}\,3 + \text{Sin}^{-1}\frac{1}{\sqrt{5}} = \frac{\pi}{4}$;

And solve the equation

$$\text{Cos}\,2\theta = 2\,\text{Sin}^2\theta,$$

5. Describe and prove the properties of *common* logarithms.

Given that one cubic foot of granite weighs 2,660 ounces, find the edge of a cubical block of granite weighing 250 tons.

[Log. 19=1·2787536; log. 17988=4·2549901, diff. for 1=243.]

6. Describe the method of the solution of a triangle when two sides and the angle contained by them are given.

A man on the top of a tower 100 ft. high observes one object south at an angle of depression of 30°, and another north-east at the same angle of depression: what is the distance between the objects?

7. Show that the area of a triangle is $\frac{1}{2}\,bc$ Sin A, and transform this into $\sqrt{s(s-a)(s-b)(s-c)}$ by using $\text{Cos}\,A = \frac{b^2+c^2-a^2}{2bc}$.

Show that the area of a quadrilateral is $\frac{1}{2}\,dd^1$ Sin θ where d, d^1 are the lengths of the diagonals and θ is the angle between them.

Approximate Cost of Paper.—Preparation, not given; printing (3,200 copies), £24.

By Authority: JOHN MACKAY, Government Printer, Wellington.—1898.

Price 9d.]