35. An equilateral triangle is constructed with its angular points on three given parallel straight lines whose distances apart are a, b, c. Prove that its area $= \dfrac{1}{2\sqrt{3}}\,(a^2 + b^2 + c^2)$.

36. Prove the following formulæ for a plane triangle :—

(1) $a \sin (B - C) + b \sin (B - A) + c \sin (A - B) = 0$.

(2) $\dfrac{a^2 - b^2}{\cos A + \cos B} + \dfrac{b^2 - c^2}{\cos B + \cos C} + \dfrac{c^2 - a^2}{\cos C + \cos A} = 0$

37. If $f(\theta)$ be a function of θ given by the equation $f(2\theta) = (1 - \tan^2\theta)\, f(\theta)$, and if $f'(0) = m$, show that $f(\theta) = m\theta \cot \theta$.

38. If $b \cdot \dfrac{y}{z} + c \cdot \dfrac{z}{y} = 0$

$c \cdot \dfrac{z}{x} + a \cdot \dfrac{x}{z} = 0$

$a \cdot \dfrac{x}{y} + b \cdot \dfrac{y}{x} = 0$

then will

$x^{-3} + y^{-3} + z^{-3} + x^{-1} y^{-1} z^{-1} = 0$

$a^3 x^3 + b^3 y^3 + c^3 z^3 + abcxyz = 0$

$a^3 + b^3 + c^3 = 5abc$.

PROBLEMS.

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39. Find the conditions that the equations
$$lx^2 + my^2 + nz^2 = 0,$$
$$ax + by + cz = 0,$$
may lead to only one set of values for the ratios $x : y : z$, and show that if this condition hold $\dfrac{lx}{a} = \dfrac{my}{b} = \dfrac{nz}{c}$.

40. Find the co-efficient of x^{2n} in the expansion of $\dfrac{1}{(1 - x)(1 + x)^4}$.

41. Find the continued product of $(1 + x + x^2)(1 + x^3 + x^6) \ldots (1 + x^{3n-1} + x^{2 \cdot 3n - 1})$.

42. Solve the equation, $2x^4 - 4x + 1 = 0$.

MODERN LANGUAGES.

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EXERCISES IN ENGLISH.

1. State the grammatical value and relation of the phrases in the following :—

(a) Beside yon straggling fence that skirts the way,
With blossomed furze unprofitably gay,
There, in his noisy mansion, skilled to rule,
The village master taught his little school.

(b) On the fifth day of the moon, which, according to the custom of my forefathers, I always keep holy, after having washed myself, and offered up my morning devotions, I ascended the high hills of Bagdad, to pass the rest of the day in meditation and prayer.

2. State clearly what the italicized pronoun stands for in each of the following :—

(a) If you disobey me you will be sorry for *it*.

(b) We tried to reconcile them but found *it* impossible.

(c) I shall remain if you think *it* advisable.

(d) I helped him whenever *it* seemed necessary.

(e) If he does not succeed *it* will not be for want of trying.

(f) *It* is more difficult than you think to do that.

(g) *It* does not matter to me where you got it.

(h) He tried to raise the window, but *that* was impossible.

(i) I learned *this* at least, to have patience with dull children.

(j) Presently they all withdrew, after which no further trouble occurred.

3. Change the following simple sentences to complex or compound by expanding :—

(a) He was evidently unwilling to go alone.

(b) It isn't a victory for any one to boast of.

(c) He was the seventh king of that name.

(d) There seems to be no likelihood of his recovering it.