4) BA, AD and angle DAB being known the angle) ABD may be found ;

(5) Angles BEA and ABE and AB being known the angles BAE and EA and EB, two of the required distances, may be found ;

(6) Angles BAE and BAC being known the angle EAC may be found ;

(7) Sides EA, AC and angle EAC being known the distance EC may be found.

C. T. I.—Prove that $a^0 = 1$.

$$\frac{a}{a} = \frac{a^1}{a^1} = a^1 \div a^1 = a^{1-1} = a^0$$

But $\frac{a}{a} = 1$. Therefore $a^0 = 1$.

L. A. D.—I would like to have the following questions solved in the REVIEW:

1. Eaton's Mathematics, p. 86, Ex. 8, viz.: A ship moves forward 24 feet while a ball is falling from the mast to the deck, a distance of 64 feet, how far does the ball move? (Eaton's answer: 68 feet.) P. S.—What path in space would the ball travel?

2. Eaton's Math., p. 86, Ex. 18, viz.: Three pegs are fixed in a wall at the corners of an upright equilateral triangle; a cord, whose length is four times that of a side of the equilateral, is hung over the pegs, its ends are tied and a weight of 5 lbs. is attached below. What is the tension of each of the pegs? (Eaton's answer $= \frac{10}{3}\sqrt{3}$.

3. Will Ex. 17, p. 38 of Eaton's Math., work out to the exact answer given in his book?

4. Will Ex. 16, p. 66, Eaton's Math., work out to the exact answer in his book?

(1) A ship moves forward 24 feet while a ball is falling from the mast to the deck, a distance of 64 feet, how far does the ball move? What path in space would the ball travel? It can easily be shown that the ball will move in a curve called a parabola. To determine the exact distance requires a long and complicated formula from the higher mathematics. Probably the author only intended an approximate answer, thus: $\sqrt{(64)^2 + (24)^2} = 68.3$, which is somwhat less than the true distance over which the ball passed.

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(2) The pegs form an equilateral triangle above the horizontal line joining the lower pegs. The cord will form another equilateral triangle below and with the horizontal line. The weight of 5 lbs. will represent the line joining the opposite vertices, and any side of the triangle will represent the tension on the pegs. When the side of an equilateral triangle is represented by 1 the perpendicular on the ba e will be $\frac{1}{2}\sqrt{3}$. Therefore, as $\frac{1}{2}\sqrt{3} : 1 :: 5 :$ Ans. $\frac{5}{1} \times \frac{2}{\sqrt{3}} = \frac{10}{\sqrt{3}} = \frac{10}{3}\sqrt{3}$.

(3) For Eaton's Practical Mathematics, p. 38, Ex. 17, see above.

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(4) Eaton's Practical Mathematics, p. 66, Ex. 16. The answers given in the book are not exactly right. They are found by using the trigonometrical rations given at the end of the book. With logarithm carried out to seven decimal places, the answer would be somewhat less.

E. J. B.—(1) Given the base, the altitude and the sum of the squares on the sides containing the vertical angle, construct the triangle.

Let ABC be the triangle of which the base BC, the altitude AD and the sum of the squares on AB and AC are known. It is required to determine the other parts. Bisect the base BC in F and join AF. Then, by a well-known exercise on II. 13, $AB^2 + AC^2 = 2\,AF^2 + 2\,BF^2$. Therefore $AF^2 = \frac{AB^2 + AC^2 - 2\,BF^2}{2}$. But $(AB^2 + AC^2)$ and BF^2 are known ; therefore AF is known.

With F as a centre and FA as radius describe a circle ; also anywhere on the line BC erect a perpendicular equal to AD, and through its extremity draw a line parallel to BC. The intersection of the circle and the line thus drawn will give the vertex of the required triangle.

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(2) Find the value of

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

Changing the signs of one factor in each denominator the expression becomes

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

Then the L. C. D. will be $(a-b)(b-c)(c-a)$.

Let $a+b+c=x$,

Then the numerators

$= -a^2(a+b)(a+c)(b-c) \ldots\ldots\ldots\ldots$

$= -a^2(x-c)(x-b)(b-c) \ldots\ldots\ldots\ldots$

$= -a^2(b-c)\{x^2-(b+c)x+bc\} \ldots\ldots\ldots\ldots$

The coefficient of x^2

$= -a^2(b-c) - b^2(c-a) - c^2(a-b) = (a-b)(b-c)(c-a)$ [p. 218).

The coefficient of x

$= -a^2(b^2-c^2) - b^2(c^2-a^2) - c^2(a^2-b^2) = 0.$

The terms which do not contain x

$= -a^2\,bc\,(b-c) - b^2\,ac\,(c-a) - c^2\,ab\,(a-b)$

$= -abc\{a(b-c) + b(c-a) + c(a-b)\} = 0.$

Therefore

$x\frac{(a-b)(b-c)(c-a)}{(a-b)(b-c)(c-a)} =$ the given expression.

$x^2 =$ " "

$(a+b+c)^2 =$ " "