

side A C is 40, the angle A B C is $37\frac{1}{2}^\circ$. Find the side A B.

No. 39.—

Proposed by William Johnston, Watford, Ont. Find all the 5th roots of unity.

No. 40.—

Proposed by Duncan McEachran, Ashgrove, Ont. The elevation of a gun is $30^\circ 10'$, with what impetus must a ball be discharged in order to strike an object situated on an oblique plane, its angle of declivity being $12^\circ 45'$, and the distance of the object 3256 feet.

No. 41.—

Proposed by A. S. McGregor, Avonbank, Ont. The price of wheat is \$1 20 per bushel; a composition of wheat and oats measuring 11 bushels is worth \$8 90, but if the proportions of wheat and oats were interchanged, it would be worth only \$8 04. Find the number of bushels of wheat in the composition, and the price of oats per bushel. *By Arithmetic.*

The following paper of 10 questions has been sent us by J. G. Hands, Principal of Training Department Jones' Commercial College, London, Ont. We consider it well got up, and will afford a splendid exercise in arithmetic for those for whom it is intended:

TRIAL EXAMINATION PAPER IN ARITHMETIC FOR SECOND CLASS TEACHERS.—(Time three hours).—

Any teacher using the following as a test, is recommended to study the conditions of the questions, and the principles involved, for two hours before commencing the solutions. The amount of paper work necessary, can be easily performed in the remaining hour.

J. G. HANDS.

1st. The interest on a certain sum, for $2\frac{1}{2}$ years at 7 per cent., is \$5 87 $\frac{1}{2}$. What is the true discount on the same sum for the same time at the same rate?

2nd. A merchant bought a certain number of yards of cloth at \$2 50 per yard. He sold two-fifths of the cloth at a profit of 25 per cent., and on the sale of the remainder he lost \$15. If his loss on the whole transaction amounted to 5 per cent., how many yards of cloth did he buy?

3rd. A, B and C do a piece of work in two days for which they are paid \$16 50. The ratio of A's work to B's is as 3 : 2, and of C's work to D's as 5 : 3. If B alone could do the work in 11 days, what should C be paid?

4th. A merchant buys a parcel of cotton goods for \$5,000 and sells half of them at 15 per cent. profit. As this rate does not satisfy him, he raises the price from 15c. to 17 $\frac{1}{2}$ c. per yard and sells the remainder. Find his total profit.

5th. I invest \$5,000 in woollen goods and sell 30 per cent. of them at a profit of 16 per cent. If \$1,000 worth are destroyed by fire, and insured at cost price, at what percentage must I sell the remainder to make an average profit of 16 per cent.?

6th. Two trains start simultaneously from Lon-

don and another station east of it. If started toward each other they will meet in two hours; if both run east the London train will overtake the other in five hours. Supposing the faster train to run 28 miles per hour, how far is the other station situated east of London?

7th. If a hogshead contain wine and water in the ratio of 3 to 2, how much must be drawn off and water substituted that the wine and water may be in equal proportions?

8. Prove this rule of Commercial Arithmetic: Assume the interest at 6 per cent. for 60 days to be as many cents as there are dollars in the principal; then calculate interest at the given time and rate by Simple Proportion.

9th. A room, the height of which is 11 feet, and the length twice the breadth, takes 143 yards of paper two feet wide to cover its walls, door and window space included. How many yards of carpet 27 inches wide will be required for the floor?

10th. In a rectangular cistern the length is twelve feet, the width $3\sqrt{5}$ feet, and the diagonal (through the centre of the rectangular space) is 15 feet. Find the weight of water it will contain if a cubic foot of water weighs 894 $\frac{1}{5}$ ounces.

Answers to Correspondents.

A. D., Toronto, Ont.—We will give the answers of the *First-class Arithmetical Question*, last examination, in our next number.

W O.—We will endeavor to give one question on Trigonometry every month.

J. Sullivan.—No is sometimes an adjective; when placed before a noun it is an adjective, and is an abbreviation of "none," as, *No man*.

Grammarian.—This correspondent wishes us to parse the italicised words in the following sentence: "I sailed *nearly round* the world." *Nearly* is an adverb modifying "round the world"; *round* is a preposition, followed by "world" in obj.; relation—world and sailed.

Thos. Hammond, Selkirk, Ont., requests us to parse the italicised words in the following: 1st, "If I could survive this wound, I would engage to beat three *times* the number I commanded this morning with a *third* of British troops, &c." 2nd, "Alas! decay and the still more remorseless white ants frustrated my murderous intentions, and *all but* left me a *victim* to my strange and active foe." *Three times* the number might be regarded as one word (the same as an established idiom), objective after *beat*; also, *a third* (as one word), objective after *with*; *all but*, an adverb modifying *left*; *victim*, a noun in opposition with *me*, or after *to be* (understood). Or, *times*, a noun governed by *beat*, and *number*, a noun governed by the preposition "of" (understood); *a*, an adjective (numeral) qualifying "third"; *third*, a noun governed by the preposition *with*; *all*, an adverb modifying "but"; *but*, an adverb modifying "left." The word *all but* seems too to have a connection with *victim*. We would like to have the views of some of our teachers and inspectors on parsing the above. Please let us hear from you in time for next number.

Teacher.—We know of no law in Canada de-