Z. Y. X.—In the Nova Scotian Provincial High School Certificates are the marks made on a certificate when the candidate has not "passed" as good for all purposes of the "33%" regulation as those made on the "pass" certificates?

They are. In Nova Scotia every candidate who goes up to examination receives a certificate of his marks on every subject examined. The "decapitated" certificates are as valuable as the "pass" certificates, so far as the standing on any of the high school subjects is concerned. A candidate who has made 33% or more on any subject as shown by his "decapitated" certificate, is all right so far as that subject is concerned for a teacher's license, even should he fall below 33 on the same subject in a subsequent "pass" examination.

C. J. D.—From 7 mi. 7 fur. 39 rd. 5 yd. 2 ft. 11 in. take 8 mi.

If from 2 ft. 11 in. you take 1 ft. 6 in. (or $\frac{1}{2}$ yd.) 1 ft. 5 in. will be left. If this $\frac{1}{2}$ yd. be added to 5 yds. you have 1 rd. This rod added to 39 rods will give 1 furlong, and this furlong added to 7 furlongs will give one mile, which added to 7 miles will give 8 miles.

You have then 7 mi. 7 fur. 39 rd. 5 yd. 2 ft. 11 in. = 8 mi. 0 fur. 0 rd. 0 yd. 1 ft. 5 in.

From this take 8 mi. and the remainder will be 1 ft. 5 in. Or the question may be solved by reducing both quantities to inches and then subtracting.

N. McL.—I will give you this in return for that. Analyze "this" and "in return for that."

"This," object of give;" "in return for that," extension of substitution; "in return for," a prepositional phrase; "that," object of the prepositional phrase.

J. B. J.—(1) Through one of the points of intersection of two circles draw a chord of one circle which shall be bisected by the other.

(2) Two equal segments of circles are described on opposite sides of the same chord AB; and through O the middle point of AB, any straight line POA is drawn, intersecting the arcs of the segments at P and Q. Show that OP = OQ.

(1) Let A be a point of intersection of two circles; B the centre of one of them. On AB describe a circle cutting the other circle in C. Then the chord AC produced will be bisected at C. The angle ACB is a right angle (III, 31) Now a line drawn from the centre of a circle at right angles to a chord of the circle bisects the chord (III, 3).

(2) Complete the circles of which the equal segments are parts. Let C and D be their centres, C and P being within one circle and Q and D within the other. Join CD; then it can be easily shown that CD will pass through O. Join CQ and DP. Then the triangles CQO and DPO are equal. (Ex. 13, Cor. p. 92).

S. A. M.—Would you recommend to me a book of recitations, dialogues, readings, etc., all in one large book? I would like to get one large book for my school to suit all grades. I never seemed to get any that had many suitable recitations and dialogues.

We do not know of any such book suitable for Canadian schools.

X. Y. Z.—Please solve the following:

(1) $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=1 \quad \frac{x}{a}+\frac{y}{c}+\frac{z}{b}=1 \quad \frac{x}{b}+\frac{y}{a}+\frac{z}{c}=1$

(2) If two straight lines be drawn from two given points to meet in a given straight line, show that the sum of these lines is the least possible, when they make equal angles with the given line.

(3) Find the locus of the vertices of triangles of equal area on the same base and on the same side of it.

1. To find x, y and z.

Clear of fractions; thus:

$$bcx + acy + abz = abc$$
$$bcx + aby + acz = abc$$
$$acx + bcy + baz = abc$$

Subtract the second equation from the first and we have

$$acy - aby + abz - acz = 0$$
$$cy - by + bz - cz = 0$$
$$cy - by = cz - bz$$
$$(c - b)y = (c - b)z$$

Therefore $x = y$; similarly by subtracting the third equation from the first we obtain $x = y$.

Then substituting in the first equation we have

$$\frac{x}{a}+\frac{x}{b}+\frac{x}{c}=1$$
$$bcx + acx + abx = abc$$
$$x = \frac{abc}{bc + ac + ab}$$

2. Let A and B be the given points on the same side of the line GH, and let AC and BC make equal angles with GH. Then the sum of the lines AC and BC is less than the sum of any other two lines drawn to a point in GH.

Take any point D. Then the sum of AC and BC is less than the sum of AD and DB. Produce AC to E, making CE = CB, join DE. Then in the triangles BCD and CDE it can be easily shown that BD = DE. But AE is less than the sum of AD and DE, that is the sum of AC and CB is less than the sum of AD and DE.

Note.—When the given points lie on different sides of the given straight line, lines making equal angles with the given straight line may be drawn such that the sum of these lines is not less than the sum of other lines not making equal angles drawn to another point.

3. By (I. 39) a line passing through the vertex and parallel to base will be the required locus.