5. If A be the given point, and O the centre of the circle, and OB, OC be perpendicular to the chords, it may readily be shown that AB and BO are equal to AC and CO. Hence the chords, being at equal distances from the centre, are equal; also $AB=AC$, whence, &c.

6. Join the given point to the centre, and on each side of the joining line make angles equal to half the given angle. Two solutions.

7. In effect Prop. 22, Bk. III., Euclid.

8. The angles are readily shown to be right angles, and thence all segments of diagonals are equal; hence point of intersection must be the centre.

9. Readily follows from fact that tangents from same point to same circle are equal.

10. It follows from preceding problem that such a parallelogram must be a rhombus. Hence a diameter bisects the angle between two tangents to the circle, and therefore passes through the centre.

11. Prop. 11, Bk. II., Euclid.

12. With the ordinary figure and lettering of Prop. 11, Bk II., Euclid, CA being the given line, the proposition enables us to produce it to F, so that CF, $FA=CA^2$. Accordingly on the given base CA construct an isosceles triangle with sides equal to CF, and employ the proof of Prop. 10, Bk. IV. Prop. 11, Bk. IV., enables us to construct the pentagon.

Solutions of the following are asked for:

1. $\sqrt[3]{a+x}+\sqrt[3]{a}-x=b$.

C. E. K.

2. $x^2+\sqrt{(x)}=a$.

3. $$\begin{cases} x^2-yz=a^2. \\ y^2-xz=b^2. \\ z^2-xy=c^2. \end{cases}$$

4. $$\begin{cases} x^2+y=a. \\ y^2+x=b. \end{cases}$$

D. J. S.

5. A, B, C and D run a race over a mile course. First A and B race, and A beats B by 20 yards; next C and D race, and C beats D by 60 yards. Then A and C race; which will win, and by how much, supposing that D could beat B by 40 yards if they were to race?

S. H. P.

Teacher sends a solution of the "contract" problem solved in the February issue. I it he assumes that the boys and men determine the price of their labor not by the work they do, but by the amount the contractor receives, the former saying that they must get half as much as the contractor, and the latter twice as much. He obtains for answer \$5250. We prefer the solution that appeared last month, the interpretation there of the words of the problem appearing more natural.

W. J. Harrington, Emily, Victoria, sends the following solution of the "interest" question of last month:

Int. on \$10,000 for 6 months at 5 p. c. = \$250.

Int. on \$1 given	1st =	int. on \$1 for	6	mos.	=	$2\frac{1}{2}$	cts.
"	2nd =	"	5	"	=	$2\frac{1}{12}$	"
"	3rd =	"	4	"	=	$1\frac{2}{3}$	"
"	4th =	"	3	"	=	$1\frac{1}{4}$	"
"	5th =	"	2	"	=	$\frac{5}{6}$	"
"	6th =	"	1	"	=	$\frac{5}{12}$	"
Total given \$6.00				Int.	=	$8\frac{3}{4}$	cts.

Then to get \$1.00 monthly requires \$6.08¾ at end of 6 months. Hence

\$6.08¾ gives \$1.00 monthly.

$$\therefore \$250 \quad " \quad \frac{\$1.00}{\$6.08\frac{3}{4}}\times\$250 \text{ monthly}=\$41.067.$$

It will be observed the result is almost identical with our own, though the methods are quite different.

Mr. L. E. Newcomb, of Alma, N.B., has forwarded the following excellent solution of Problem 4, January issue:—If A, B, C be the centres of the circles whose radii are 100, 20, 40, respectively, the locus of the centres of circles touching the circles at B and C will be an hyperbola, whose foci are B and C, transverse axis $a=\frac{1}{2}(40-20)$, distance of foci from centre of curve $ae=\frac{1}{2}(240)$ and conjugate axis $b=\sqrt{a^2e^2=a^2}$. Hence its equation referred to B as focus and BC as initial line will be

$$r=\frac{b^2}{a+ae\cos\theta}$$

Similarly the equation to the locus of centres of circles touching those at A and B will be

$$r'=\frac{b'^2}{a'+a'e'\cos\theta'}$$

The centre of the required circle will be the intersection of these curves, at which point $r=r'$ and $\theta+\theta'=ABC$. From these equations r is found, and thence the diameter of the required circle, which Mr. Newcomb finds to be 254.773 ft.

Mr. Park sends the following answers to his problems in last number: (1) S. Lat. 46° 48', Long. = 160° 29' 30". (2) Rt. Ascen. = 49° 19', Dec. = 15° 59' 30". (3) Obliquity of ecleptic = 23° 28', Long. = 73° 55'. (4) Dis. bet. centres = 112° 53' 30".

ANSWERS TO CORRESPONDENTS.

YOUNG TEACHER.—A so-called Arithmetical solution, if found, will be an Algebraic one disguised. In reference to your second question: From the ends of the 275 side drop perpendiculars y, y on the 385 side, and let x be one of the segments of this side between its end and the foot of y; then $110-x$ is the other. Hence $x^2+y^2=(155)^2$; $(110-x)^2+y^2=(125)^2$. Eliminating y^2 we have a quadratic to determine x. Thence y is found.

T. R. B.—The solution of your problem will be obtained by remembering that the line joining the bisections of the sides of a triangle is parallel to the base.

M. W.—Denote the first number briefly by 1*abcde*, and therefore the second by *abcde*1. Then

$$\begin{array}{r} 1abcde \\ 1 \\ \hline abcde1 \end{array}$$

It will be observed that when the nine digits are multiplied by 3, each gives a different digit in the units place. Hence e must be 7. 2 is carried, and therefore d multiplied by 3 gives 5 in the units place, and d must be 5. Similarly the other digits may be obtained. (Prob. 61, page 163, H. Smith's Algebra.)

J. T. H.—The solution of your problem will be found in our issue of November, 1879. The condition is that the opposite angles of the quadrilateral shall be together equal to two right angles.

D. J. S.—The character of the problem seems to forbid what you call an arithmetical solution. However, such enquiries are extremely unprofitable. The object of employing an elementary method should be in the main to simplify a process; here it would certainly complicate it. We would prefer spending our time in solving "14, 13, 15."

In the first question you propose you say "Examination Papers," without indicating which you mean. Please send the problem.