6. Comment upon the anemometer, Pitot tube, and powder-smoke for the measurement of the velocity of mine-air. State the limitations of each method.
7. Make sketches showing in plan and section the arrangement from mine shaft to chimney of a double-inlet Sirocco fan capable of producing 85,000 cubic feet of air per minute. State dimensions.

Subject IV.—*Arithmetic and Law.*

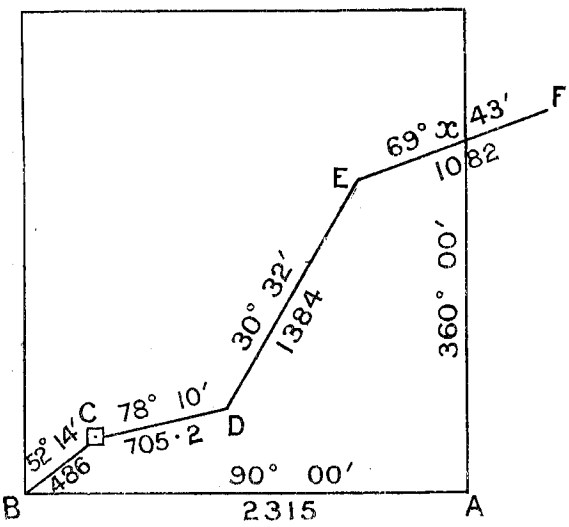
ARITHMETIC.

1. Find the cubical contents of a circular well whose diameter is $3\frac{1}{2}$ ft. and depth 28 ft.
2. Find correct to 4 places of decimals the square root of 52167809·72456139.
3. The gold reserve of a bank weights 27 tons 10 cwt. 3 qr. 3 lb.: if there be 7,000 grains in 1 lb. avoirdupois, and a sovereign weigh 123·374 grains, find the value of the reserve.
4. Determine the gross receipts of a company for the first half-year of 1913, given that the gross expenses, £285,900, were 65·86 per cent. of the receipts. Give result to nearest £1,000.
5. How many pieces of timber, each 6 ft. by $1\frac{1}{2}$ ft. by 3 in., can be cut from a piece 45 ft. long, 4 ft. wide, and 3 ft. thick?

LAW.

1. State the requirements with regard to ventilation of quartz-mines.
2. Quote in full the uniform code of signals required at all mines.
3. State the legal procedure to be followed when a fatal accident occurs.
4. What is a workmen's inspector? How is he appointed, and what are his duties?

Subject V.—*Surveying.*



1. The above diagram represents a mining claim with a shaft at C. A lode is followed from C to D, D to E, and E to F. Compute the extent of encroachment in cubic yards upon the adjoining portion, assuming the drive to be rectangular and 6 ft. high by 4 ft. wide; and what is the distance from A to x? The distances are given in links.
2. Compute the area within the figure A B C D E x.
3. A vertical shaft at G is sunk for a depth 75 ft. to H. The cap of a reef is noted at I, which is 50 ft. east of G. From H a crosscut is driven 80 ft. which cuts the reef at J. If the vertical shaft is continued 200 ft. from H to K, find the length of the crosscut K to L necessary to intersect the reef.

Subject VI.—*General and Applied Geology.*

1. Define any six of the following terms: Lode, vein, ore, contact-deposit, gash-vein, saddle-reef, deep lead, pay-wash, false bottom.
2. Give a table showing the sequence of the chief geological formations in New Zealand; *or*, as an alternative, in Great Britain or in Australia.
3. Give an account of the manner in which sedimentary deposits are formed.
4. Describe the geology of any mining district in New Zealand or elsewhere with which you are familiar.
5. Where in New Zealand are found ores or minerals containing—Tungsten, tin, molybdenum, silver, copper, antimony?
6. Describe the "ascension theory" of lode-formation. If you disagree with it, state why, and give an alternative hypothesis.
7. Give a full account of what is known as "secondary enrichment."
8. Why are some mines much troubled by water, whilst others are comparatively dry? So far as you are able, discuss the geological conditions concerned. Give examples of wet and of dry mines.
9. Why do mines get hotter in depth, and why are some mines hotter than others of equal depth? In discussing this question state the conditions in two or more of the following districts: Hauraki Goldfield, Reefton, Bendigo, Rand (Johannesburg), Lake Superior, Nevada (Comstock Lode).