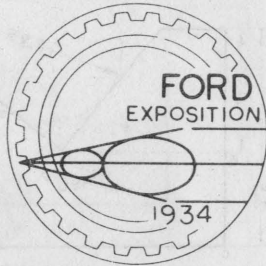


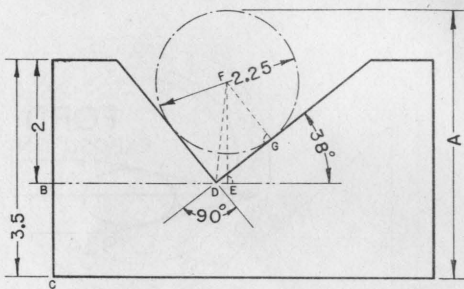
25A



**PRACTICAL
SHOP
MATHEMATICS**

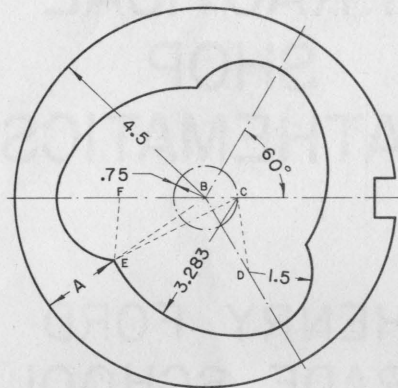
**HENRY FORD
TRADE SCHOOL**

DEARBORN MICHIGAN



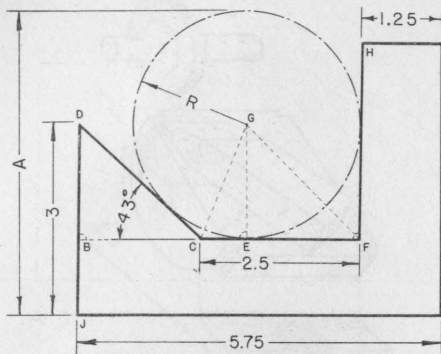
DETERMINE THE DISTANCE A.

$$\begin{aligned} BC &= 3.5 - 2 = 1.5 & \angle FDG &= 90^\circ + 2 = 45^\circ \\ FG &= 2.25 + 2 = 4.25 & FD &= (FG) \cos 45^\circ = 1.5909 \\ \angle FDE &= 45^\circ + 38^\circ = 83^\circ & FE &= (FD) \sin 83^\circ = 1.579 \\ A &= BC + FE + FG = 4.204 \end{aligned}$$



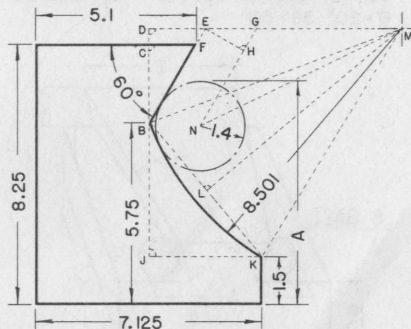
DETERMINE THE DISTANCE A.

$$\begin{aligned} \angle CBD &= 60^\circ & CD &= 3.283 - 1.5 = 1.783 \\ \sin \angle CDB &= (BC) \sin 60^\circ + CD = 3.6428 & \angle CDB &= 21^\circ 21' 49'' \\ BD = BF &= (BC) \cos 60^\circ + (CD) \cos \angle CDB = 2.0355 \\ CF &= BF + BC = 2.7854 & FE &= 1.5 \\ \cos \angle FCE &= (CF)^2 + (CE)^2 - FE^2 \div 2(CF)(CE) = .89051 \\ \angle FCE &= 27^\circ 3' 46'' \\ \cot \angle BEC &= (CE) \csc \angle FCE \div BC - \cot \angle FCE = 7.6644 \\ \angle BEC &= 7^\circ 26' 21'' \\ BE &= (BC) (\sin \angle FCE) \csc \angle BEC = 2.637 \\ A &= 4.5 - BE = 1.863 \end{aligned}$$



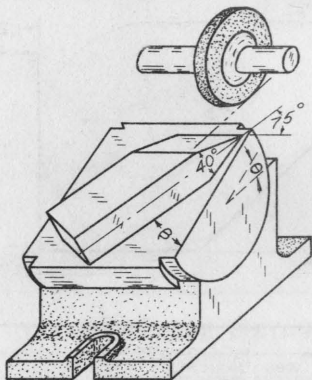
DETERMINE THE DISTANCE A.

$$\begin{aligned} \angle GCE &= \angle DCE + 2 = 68^\circ 30' & \angle GFE &= \angle HFE + 2 = 45^\circ \\ GE &= 2.5 + (\cot 68^\circ 30' + \cot 45^\circ) = 1.7935 \\ BC &= 5.75 - 2.5 - 1.25 = 2 & BD &= (BC) \tan 43^\circ = 1.865 \\ BJ &= 3 - BD = 1.135 & GE + R &= A = BJ + GE + R = 4.722 \end{aligned}$$



DETERMINE THE DISTANCE A.

$$\begin{aligned} BJ &= 5.75 - 1.5 = 4.25 & BC &= 8.125 - 5.75 = 2.5 \\ CF &= (BC) \cot 60^\circ = 1.4433 & JK &= 7.125 - 5.1 + CF = 3.4683 \\ \tan \angle KBJ &= JK + BJ = .81607 & \angle KBJ &= 39^\circ 13' 11'' \\ BK &= (BJ) \sec \angle KBJ = 5.4854 & BL &= BK + 2 = 2.7427 \\ \cos \angle MBL &= BL \div BM = .32263 & \angle MBL &= 71^\circ 10' 41'' \\ \angle DBM &= 180^\circ - \angle MBL - \angle KBJ = 69^\circ 36' 18'' \\ BD &= (BM) \cos \angle DBM = 2.9625 & DM &= (BM) \sin \angle DBM = 7.9680 \\ DE &= (BD) \cot 60^\circ = 1.7103 & EH &= 1.4 \\ EG &= (EH) \csc 60^\circ = 1.6165 & GM &= DM - DE - EG = 4.6412 \\ MN &= (5.50) - 1.4 = 7.101 & \sin \angle GNM &= (GM) \sin 60^\circ = MN = .56603 \\ \angle GNM &= 34^\circ 28' 25'' & \angle GNM &= 60^\circ - \angle GNM = 25^\circ 31' 35'' \\ A &= 5.75 + BD - (MN) \sin \angle GNM + 1.4 = 7.0526 \end{aligned}$$

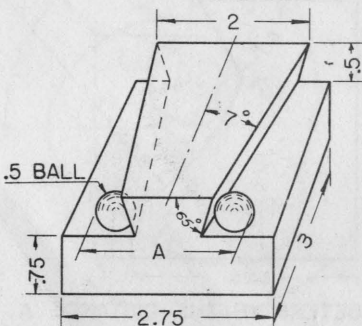


DETERMINE THE ANGLES β & θ

$$\beta = 90^\circ - 75^\circ = 15^\circ$$

$$\text{COT } \theta = \text{SIN } 75^\circ \text{ COT } (40^\circ \div 2) = 2.6538$$

$$\theta = 20^\circ 38' 50''$$



DETERMINE THE DISTANCE A

D = DIAMETER OF BALL

$$\text{TAN } \beta = \text{TAN } 65^\circ \text{ SEC } 7^\circ = 2.1605$$

$$\beta = 65^\circ 9' 46'' \quad \beta \div 2 = \theta = 32^\circ 34' 53''$$

$$X = 2 \div 2 - 3 \text{ TAN } 7^\circ - .5 \text{ COT } 65^\circ = .39850$$

$$A = D [\text{COT } \theta \text{ SEC } 7^\circ + \text{TAN } 7^\circ + 1] + 2X = 2.1466$$