!PLANE182: 4-nodes, 2D element, 2DOF/NODE (UX,UY)

!Steel, E=30E6, Poisson’s ratio 0.3

!Units are inches and pounds (therefore, E and stress are psi)

FINISH !Finishes any previous activity

/CLEAR !Clears any previous activity

/BATCH !Works in “batch” mode

/PREP7

!Define geometry and load parameters.  
!Flat 2X0.5X20 plate with 20mm dia hole in middle

LENGTH=10

HEIGHT=2

THICKNESS=0.5

RADIUS=0.5  
PRSR=-1 !applied stress of 1psi

YOUNG=30E6

POIS=0.3

ET,1,PLANE182

MP,EX,1,YOUNG

MP,PRXY,1,POIS

KEYOPT,1,3,3 !Use plane stress (through the thickness)

R,1,THICKNESS !Use “THICKNESS” as the through thickness dimension

!Define locations of key points.

K,1,0,0,0

K,2,0,HEIGHT,0

K,3,LENGTH,HEIGHT,0

K,4,LENGTH,0,0

K,5,LENGTH/2,HEIGHT/2,0

L,1,2 !Create a line connecting Key Points 1 and 2.

L,2,3 !Line connect KP 2 and 3

L,3,4

L,4,1

CIRCLE,5,RADIUS !circle’s center is KP5

/PNUM,AREA,1

AL,ALL

SMRTSIZE,2

AMESH,ALL

FINISH

/SOLU

!Constrain in x directions the nodes at right edge:

NSEL,S,LOC,X,0 !select all nodes along X=0

D,ALL,ALL,0 !Prevents ALL displacement of selected nodes

!Apply force at right edge:  
!To apply a total force of LOAD, divide the LOAD by the area the pressure is acting on

NSEL,S,LOC,X,LENGTH

SF,ALL,PRES,PRSR

ALLSEL !Since we have used NSEL to select specific nodes, we now need ALLSEL to select all of the nodes

SOLVE

FINISH

/POST1

/ESHAPE,1 !Display element shapes using section data

/RGB,INDEX, 0, 0, 0,15 !set text color to black

/COLOR,WBAK,14 !Set background color to light grey

/DSCALE,ALL,1 !Plot using true scale

!/VIEW,1,1,1,1

FINISH !Finish and exit the post-processor

SAVE !Save the data base