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

!Steel, E=30E6 psi, Poisson’s ratio 0.3

!Units are inch and lb (therefore, E and stress are psi)

!Models the Echidna beam in the workbook

!NOTE: Echidna beam in the workbook is NOT drawn to scale.

FINISH !Finishes any previous activity

/CLEAR !Clears any previous activity

/BATCH !Works in “batch” mode

/PREP7

!Define geometry and load parameters.  
LENGTH=40

HEIGHT=4

THICKNESS=3

RADIUS=0.5  
WEIGHT=4000

ET,1,PLANE182

MP,EX,1,30E6

MP,PRXY,1,0.33

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

K,2,0,HEIGHT

K,3,LENGTH/2,HEIGHT

K,4,LENGTH,HEIGHT

K,5,LENGTH,0,0

K,7,LENGTH/4,HEIGHT/2 !MIDDLE OF LEFT HOLE

K,8,LENGTH/2,HEIGHT/2 !MIDDLE OF CENTER HOLE

K,9,3\*LENGTH/4,HEIGHT/2 !MIDDLE OF RIGHT HOLE

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,4,5

L,5,1

CIRCLE,7,RADIUS

CIRCLE,8,RADIUS

CIRCLE,9,RADIUS

/PNUM,AREA,1

AL,ALL

SMRTSIZE,1

AMESH,ALL

FINISH

/SOLU

!Constrain KP 1 UX, UY AND KP 5 IN UY

DK,1,ALL,0 !Prevents ALL (UX,UY) displacement of selected nodes

DK,5,UY,0

!Apply force at KP 3  
FK,3,FY,-WEIGHT

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