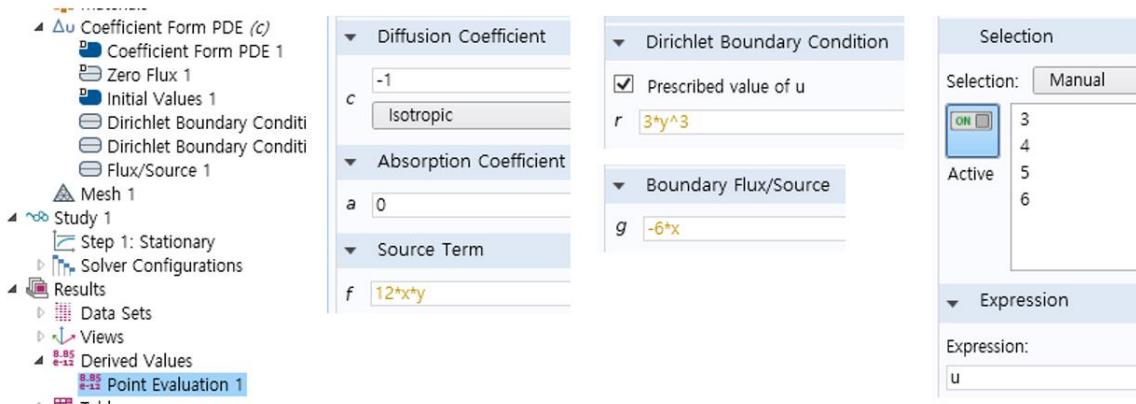
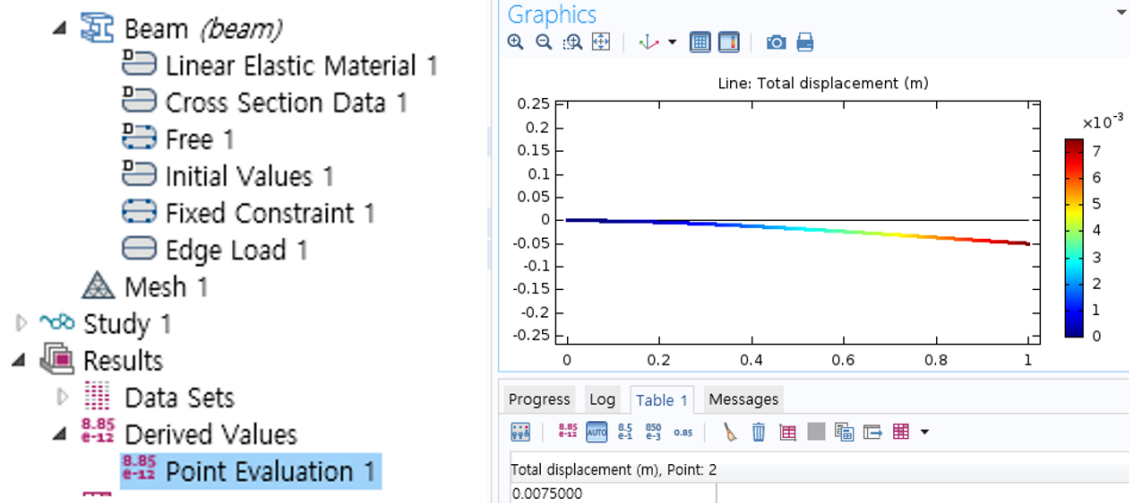


pb1	setting(1), geom.(2), poisson eq.(3), dirichlet con.(3), neumann con.(3), sol.(3)
pb2	1) geom.(1), property(1), cross section(2), fixed(1), load(1), sol.(2)
	2) geom.(2), property(1), fixed(1), load(1), table(8), question(2)
pb3	1) geom.(4), discretization(1), property(1), fixed(1), load(2), symmetry(3), plot(3)
	2) tria cal.(5), quad cal.(5), graph(3), question(2)
	3) K of each radius(2)
pb4	1) geom.(2), property(1), fixed(1), pinned(1), load(1), critical load(1)
	2) geom.(2), property(1), fixed(1), pinned(1), load(1), critical load(1)
	3) cal. radius(1), geom.(2), property(1), fixed(1), pinned(1), load(1), critical load(1), question(2)
timeover	초과 2분당 -1점
기타	문제 별 결과 미 첨부시 -1점

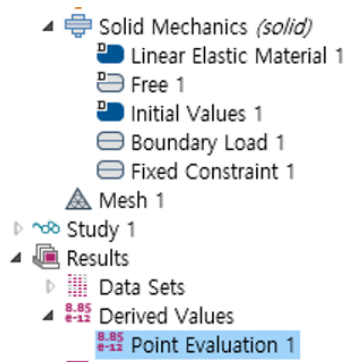
1.



2. 1)



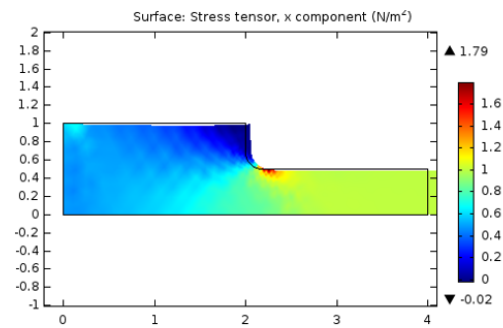
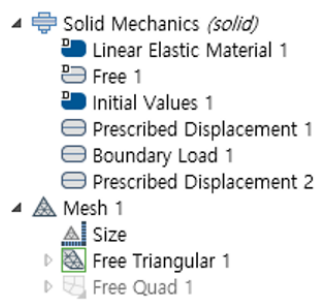
2)



h (L/h)	Anal. (mm)	FEM (mm)	Error (%)
0.05 (20)	-60	-60.06	0.1
0.1 (10)	-7.5	-7.56	0.8
0.2 (5)	-0.9375	-0.9671	3.2
0.5 (2)	-0.06	-0.0715	19.2

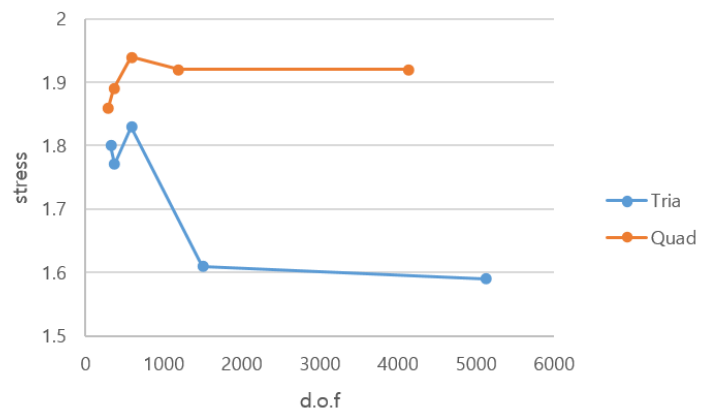
The length-to-height ratio should be greater than 10.

3.



r (m)	Anal.	FEM
0.08	2.6	2.47
0.12	2.3	2.18
0.18	2.0	1.92
0.26	1.8	1.72

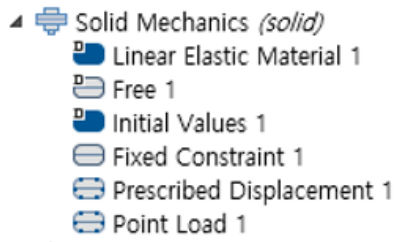
r=0.18	tria		quad	
	dof	K	dof	K
normal	320	1.8	292	1.86
fine	372	1.77	362	1.89
finer	586	1.83	584	1.94
extra	1494	1.61	1186	1.92
extremely	5124	1.59	4128	1.92



Because the stress variation is small with the increase of d.o.f when using the quad elements, it is more proper than using the triangular elements.

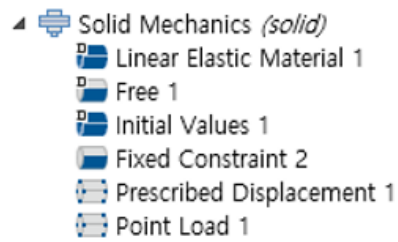
4.

(1)



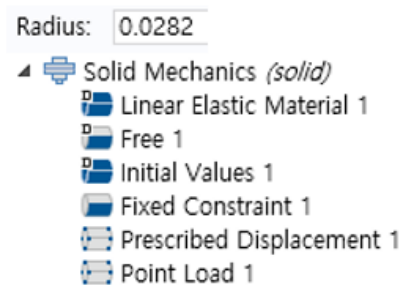
Critical load factor=2.0796E6

(2)



Critical load factor=2.0899E6

(3)



Critical load factor=1.9729E6

Because a critical load of the square column is larger than a load of the round column, the square shape is good for buckling.