Question 2, Unknown Standard Deviation

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A <- power.t.test(n=5, delta=100, sd=75, sig.level=0.05, power=NULL, type='one.sample')  
A$power

## [1] 0.6141832

Power for this unknown standard deviation case is 61.4%.

B <- power.t.test(n=NULL, delta=100, sd=75, sig.level=0.05, power=0.9, type='one.sample')  
B$n

## [1] 8.072323

The number of participant required for this study with unknown standard deviation is 8.07, which we always round up to 9 participants.

C <- power.t.test(n=5, delta=NULL, sd=75, sig.level=0.05, power=0.9, type='one.sample')  
C$delta

## [1] 147.4417

The smallest mean change in beta carotene required for this scenario with unknown standard deviation and 90% power is 147.4.

D <- power.t.test(n=5, delta=NULL, sd=75, sig.level=0.05, power=0.8, type='one.sample')  
D$delta

## [1] 126.1498

The smallest mean change in beta carotene required for this scenario with unknown standard deviation 90% power is 126.1.