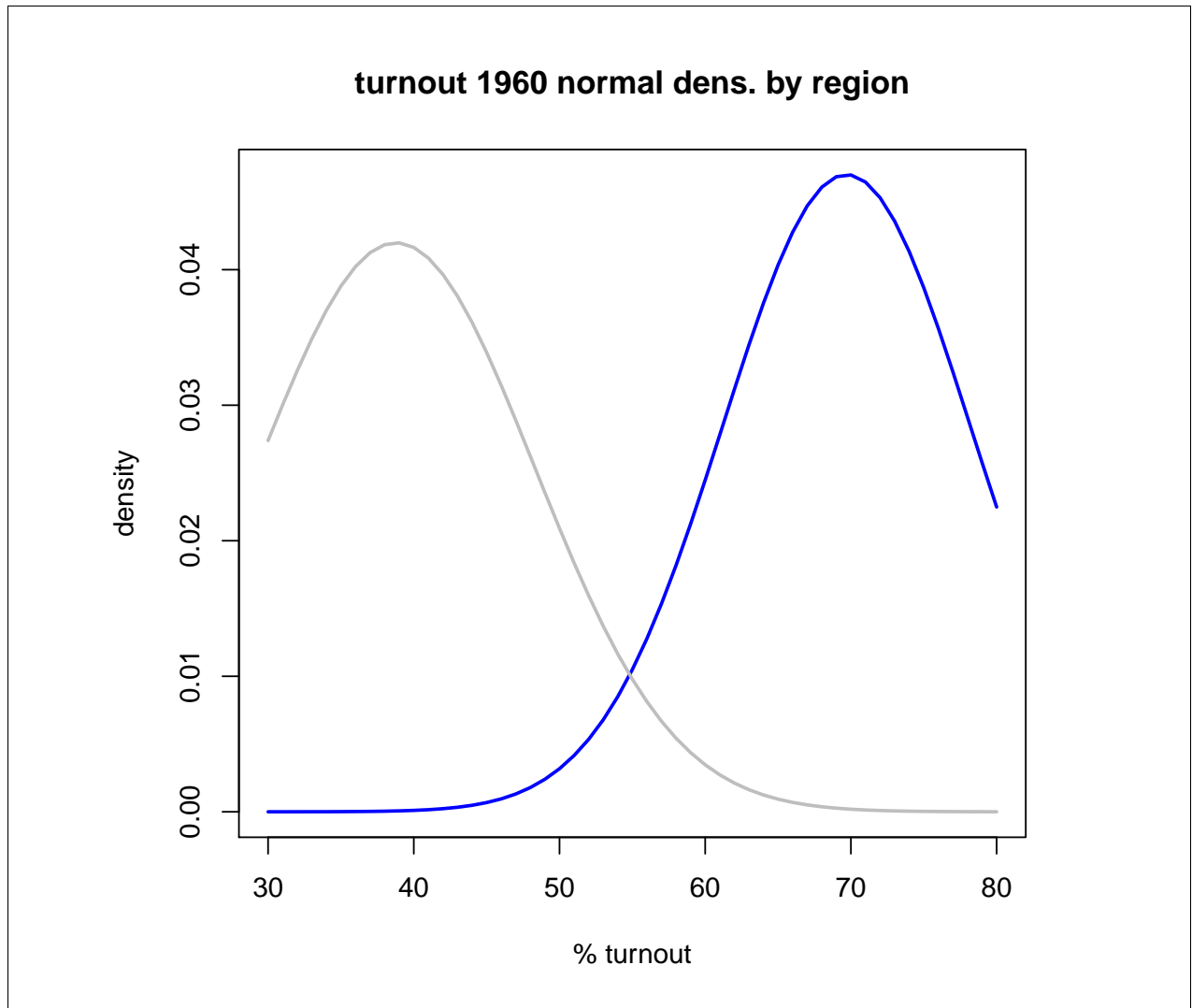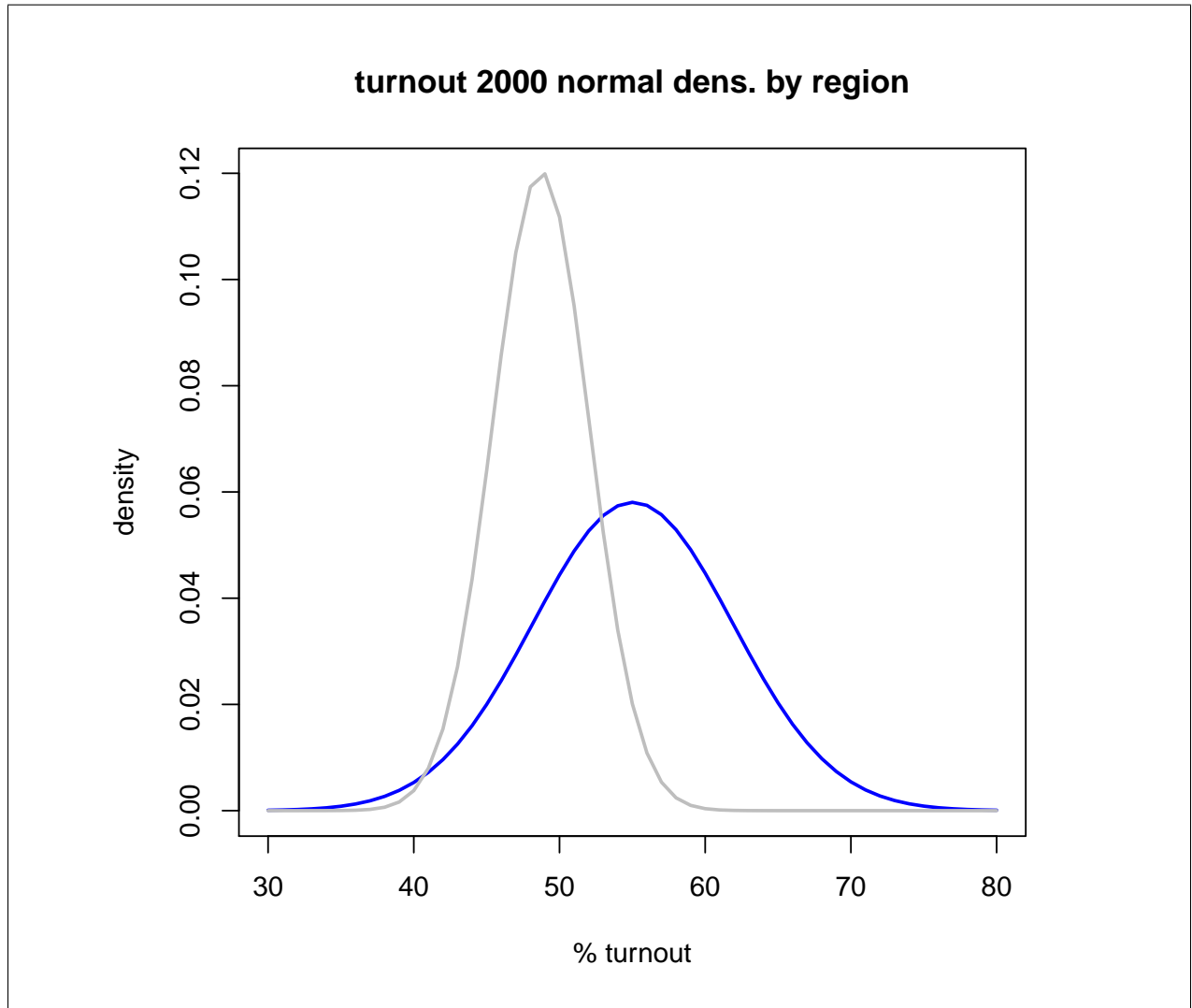# Exercise 1: 20 points

Students should have plot fairly similar to the below. Dock for deviations such as not labeled axes, no title, truncation of plot, etc.

turnout 1960 normal dens. by region

turnout 2000 normal dens. by region

(figure: density plot of % turnout, grey and blue curves)

Exercise 2: 20 points

1960: definitely not. 2000: possibly... there's a lot of overlap.

Exercise 3: 20 points

Observation of decreasing gap is supported since the maximum gap between parent populations in 1960 is very much smaller than that in 2000. If repeated for interceding years, we'd probably see center of density curves move closer over time, as well as convergence in shapes of the curves (i.e. decrease in difference in spread).

Exercise 4: 20 points

```
> ds = turnout$deepsouth
> t60s = turnout$p1960[ds == 1]
> t60n = turnout$p1960[ds == 0]
> t00s = turnout$p2000[ds == 1]
> t00n = turnout$p2000[ds == 0]
> ### calcs ###
> pnorm( 50, mean( t60s ), sd( t60s ) ) #1

[1] 0.881143

> 1-pnorm( 70, mean( t60n, na.rm=T ), sd( t60n, na.rm=T ) ) #2

[1] 0.4856562

> pnorm( 60, mean( t00s ), sd( t00s ) ) - pnorm( 40, mean( t00s ), sd( t00s ) ) #3

[1] 0.9954161

> pnorm( 60, mean( t00n ), sd( t00n ) ) - pnorm( 40, mean( t00n ), sd( t00n ) ) #4

[1] 0.7506559
```

Exercise 5: 20 points

Response should talk about how CDF is area under density curve, which parts of curve we are actually calculating areas of, etc. Calculated again, we would expect to see fewer extreme values over time and more mass between 40 and 60.