Question 1

a)

```
midwest_modified %>% group_by(state) %>% summarise(Highest_Pop_Den = max(popdensity))
```

midwest_modified %>% group_by(state) %>% summarise(Highest_Pop_Den = max(popdensity))

b)

```
midwest_modified %>% select(county,state,inmetro) %>% slice(1:5) %>% mutate(Metro = ifelse(inmetro == 1, "Metro", "NonMetro"))
```

midwest_modified %>% select(county,state,inmetro) %>% slice(1:5) %>% mutate(Metro = ifelse(inmetro == 1, "Metro", "NonMetro"))

c)

```
dens_table <- tibble1 %>%  group_by(state, Metro) %>% summarise(Highest_Pop_Den = max(popdensity))

dens_table
```

dens_table <- tibble1 %>% group_by(state, Metro) %>% summarise(Highest_Pop_Den = max(popdensity))

dens_table

Here, tibble1 is the modified tibble from part b

d)

```
pivot_wider(dens_table, names_from = Metro, values_from = Highest_Pop_Den)
```

pivot_wider(dens_table, names_from = Metro, values_from = Highest_Pop_Den)

e)

```
midwest_modified %>% slice(1:5) %>% select(county, popdensity) %>% mutate(HighDens = ifelse(popdensity > 1500, "High", "NotHigh"))
```

midwest_modified %>% slice(1:5) %>% select(county, popdensity) %>% mutate(HighDens = ifelse(popdensity > 1500, "High", "NotHigh"))

f)

```
> pop_xtabs["IL",1,2]
[1] 250175
```

[1] 250175

g)

```
apply(pop_xtabs, 3, sum)
```

apply(pop_xtabs, 3, sum)

h)

```
pop_xtabs<-xtabs(
  I(popwhite+popblack+popamerindian+popasian+popother)~
    state+HighDens+HighDens,data=midwest_modified)
```

pop_xtabs<-xtabs(
I(popwhite+popblack+popamerindian+popasian+popother)~
state+HighDens+HighDens,data=midwest_modified)

pop_xtabs

i)

```
prop.table(pop_xtabs, margin = 1) * 100
```

prop.table(pop_xtabs, margin = 1) * 100