Question 8

Joseph Froelicher

### Part A

x = -3:2  
y\_a = vector("double", length(x))  
y\_b = vector("double", length(x))  
  
for (i in 1:length(x)) {  
 y\_a[i] = (3 \* (x[i] ^ 3)) + (x[i] ^ 2) + (4 \* x[i]) + 2  
 y\_b[i] = (2 \* (x[i] ^ 2)) + x[i] - 3  
}  
  
y\_a

## [1] -82 -26 -4 2 10 38

y\_b

## [1] 12 3 -2 -3 0 7

y\_a \* y\_b

## [1] -984 -78 8 -6 0 266

### Part B

In the context of FFT, we use point-value representation, because the multiplication of polynomials is very expensive (). However, if we use the FFT method, and do point-value representation for our multiplaction the result is the same, with time reduction to .