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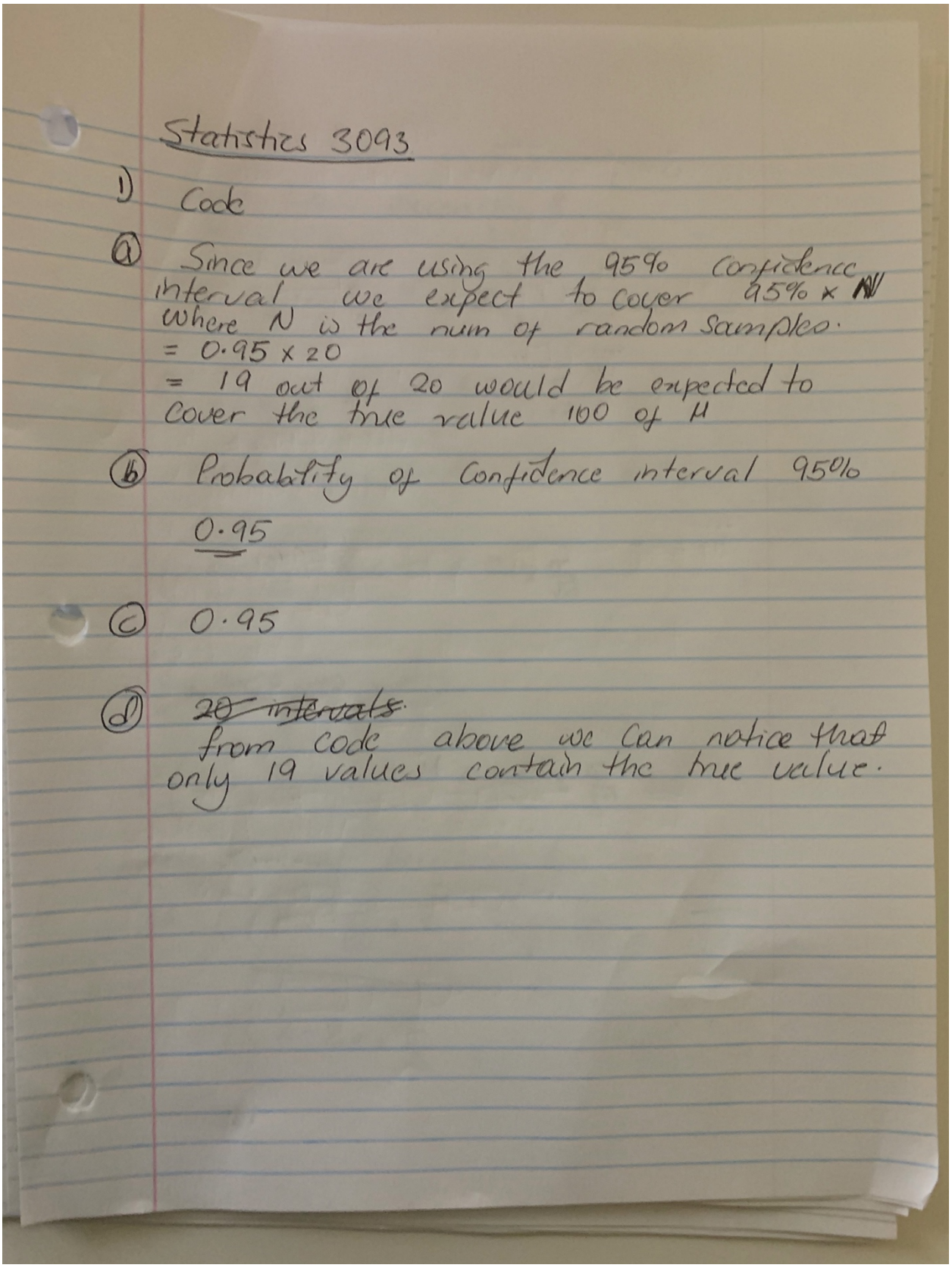
1) CODE

```
# M: number of samples
# n: sample size
M = 20
n = 30
mu = 100
sigma = 15

for(m in 1:M){
  x = rnorm(n, mean = mu, sd = sigma)
  xbar = mean(x)
  ME = 1.96*sigma/sqrt(n)
  lowerLomit =xbar-ME
  UpperLimit = xbar+ME
  Outside = ifelse(mu<lowerLomit | mu>UpperLimit, 1, 0)
  cat("Sample", m, ": ",
      round(c(xbar-ME, xbar+ME), 2), "\t", Outside, "\n")
}
```

CODE OUTPUT

```
Sample 1 :  93.67 104.4          0
Sample 2 :  92 102.74    0
Sample 3 :  95.47 106.2          0
Sample 4 :  97.28 108.02         0
Sample 5 :  96.31 107.05         0
Sample 6 :  97.35 108.09         0
Sample 7 :  95.18 105.92         0
Sample 8 :  97.06 107.8          0
Sample 9 :  95.91 106.65         0
Sample 10 :  101.11 111.84       1
Sample 11 :  96.19 106.92        0
Sample 12 :  93.07 103.81        0
Sample 13 :  96.64 107.37        0
Sample 14 :  93.46 104.19        0
Sample 15 :  91.49 102.23        0
Sample 16 :  95.87 106.61        0
Sample 17 :  95.07 105.81        0
Sample 18 :  93.01 103.74        0
Sample 19 :  94.36 105.09        0
Sample 20 :  98.59 109.33        0
```



Statistics 3093

1) Code

(a) Since we are using the 95% confidence interval we expect to cover 95% × N where N is the num of random samples.
= 0.95 × 20
= 19 out of 20 would be expected to cover the true value 100 of μ

(b) Probability of confidence interval 95%
0.95

(c) 0.95

(d) ~~20 intervals~~.
from code above we can notice that only 19 values contain the true value.