Andrew Moore, 09/23/2021

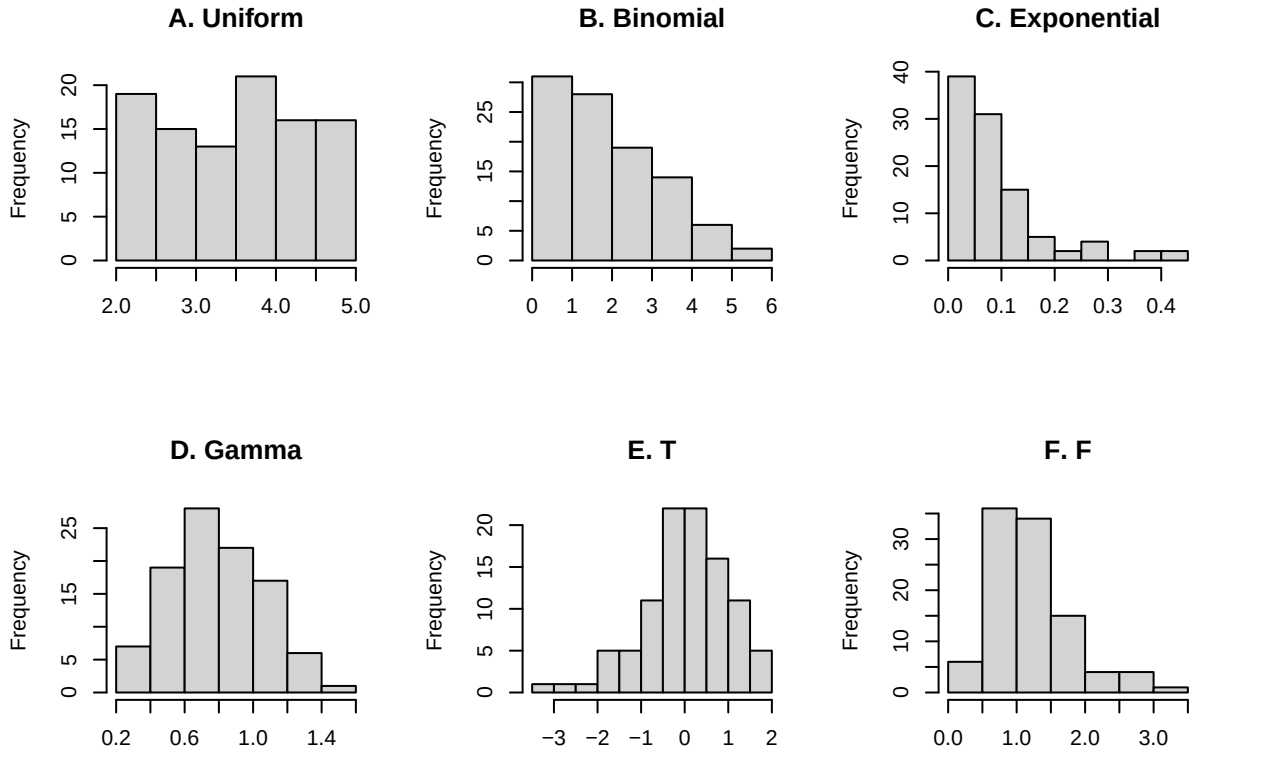
MATH-471, Homework 3.1

1. Generate samples of n = 100 for 10 different distributions.

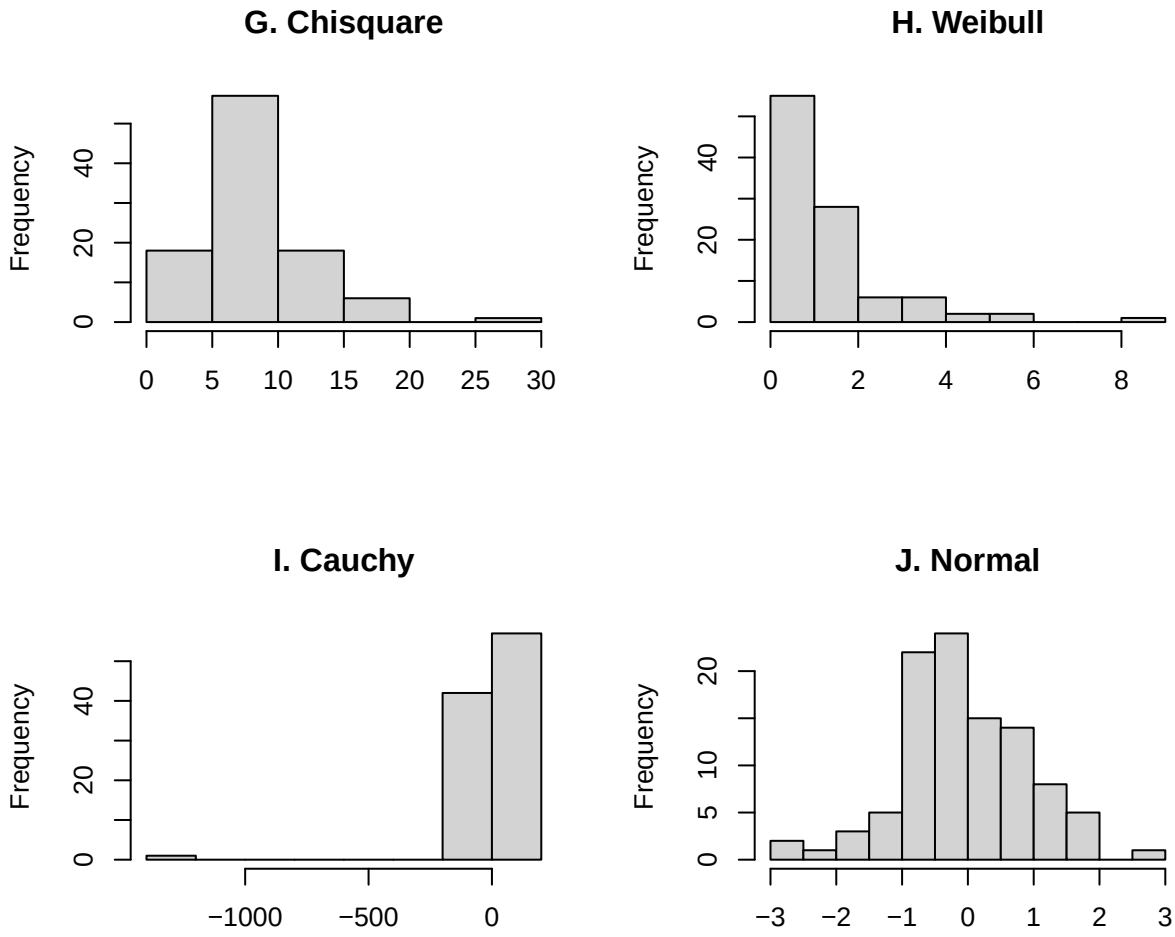
```
samples <- list(
  "A. Uniform"     = runif(100, 2, 5),
  "B. Binomial"    = rbinom(100, 25, 0.1),
  "C. Exponential" = rexp(100, 10),
  "D. Gamma"       = rgamma(100, 8, 10),
  "E. T"           = rt(100, 25),
  "F. F"           = rf(100, 15, 15),
  "G. Chisquare"   = rchisq(100, 9),
  "H. Weibull"     = rweibull(100, 1, 1.5),
  "I. Cauchy"      = rcauchy(100, 0, 1),
  "J. Normal"      = rnorm(100, 0, 1)
)
```

2. Create histograms for each of the 10 distributions, and describe their shapes.

```
par(mfrow = c(2, 3))

for (i in 1:6) hist(samples[[i]], main = names(samples)[i], xlab = "")
```

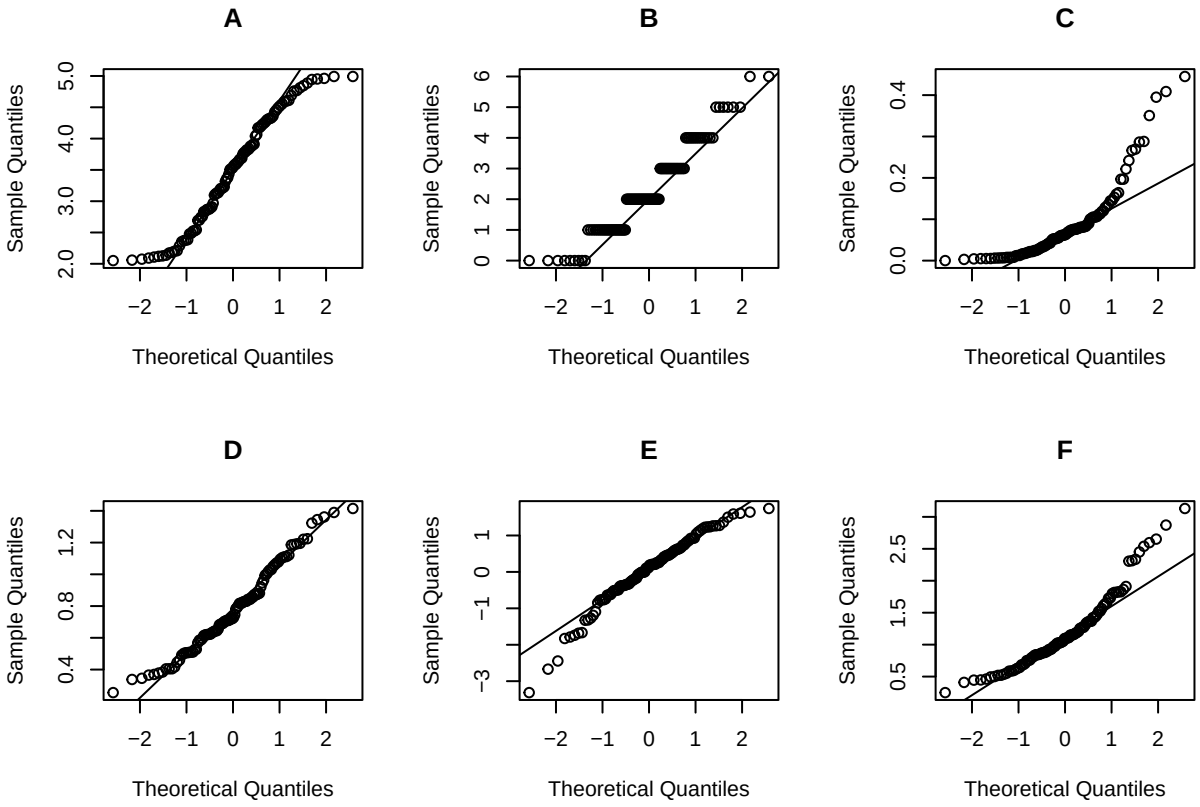


```r
par(mfrow = c(2, 2))

for (i in 7:10) hist(samples[[i]], main = names(samples)[i], xlab = "")
```



3. Use QQ-plots to determine if the sample comes from a *normal* distribution.

```
par(mfrow = c(2, 3))

for (i in 1:6) {
  qqnorm(samples[[i]], main = LETTERS[i])
  qqline(samples[[i]])
}
```

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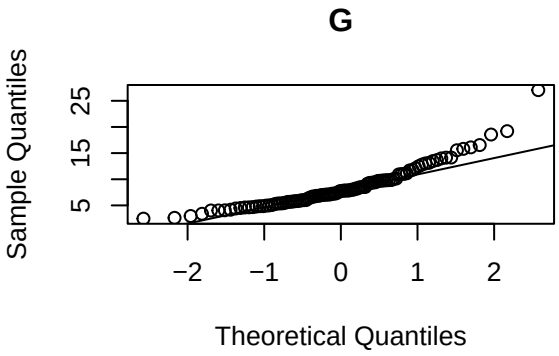
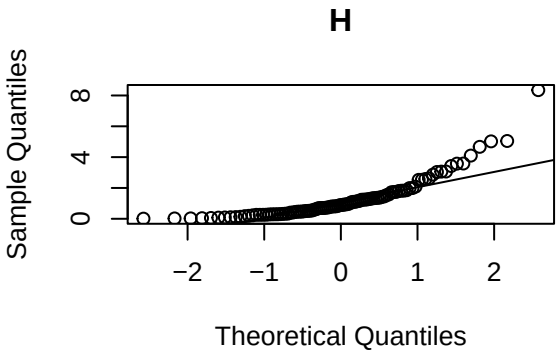
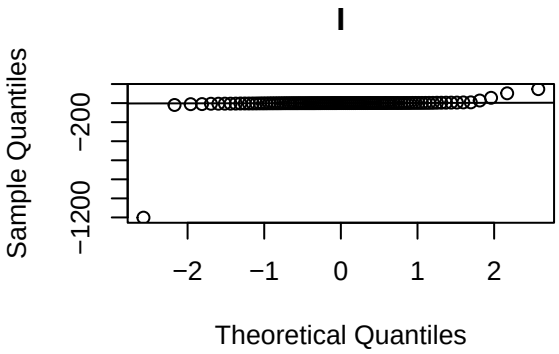
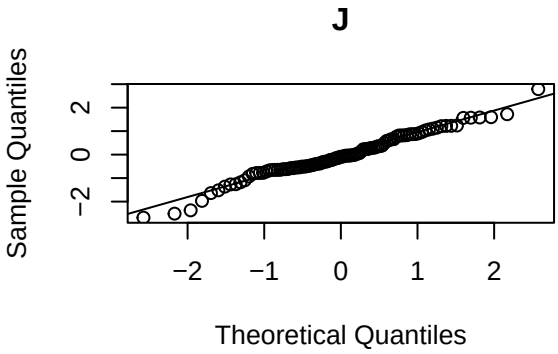

G
Sample Quantiles
5
15
25
−2
−1
0
1
2
Theoretical Quantiles


H
Sample Quantiles
0
4
8
−2
−1
0
1
2
Theoretical Quantiles


I
Sample Quantiles
−1200
−200
−2
−1
0
1
2
Theoretical Quantiles


J
Sample Quantiles
−2
0
2
−2
−1
0
1
2
Theoretical Quantiles