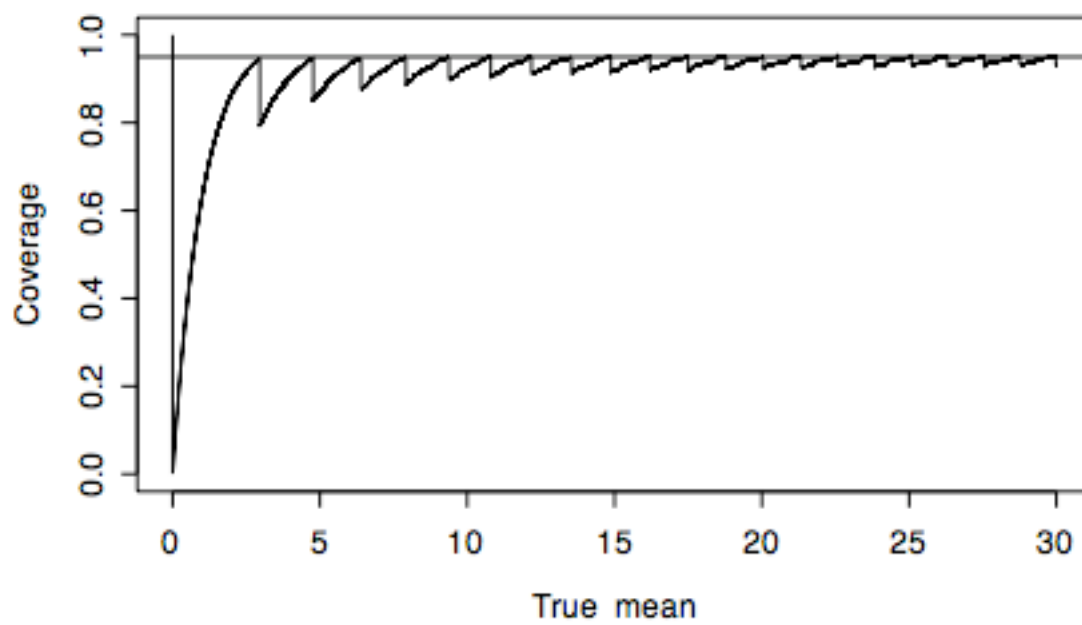
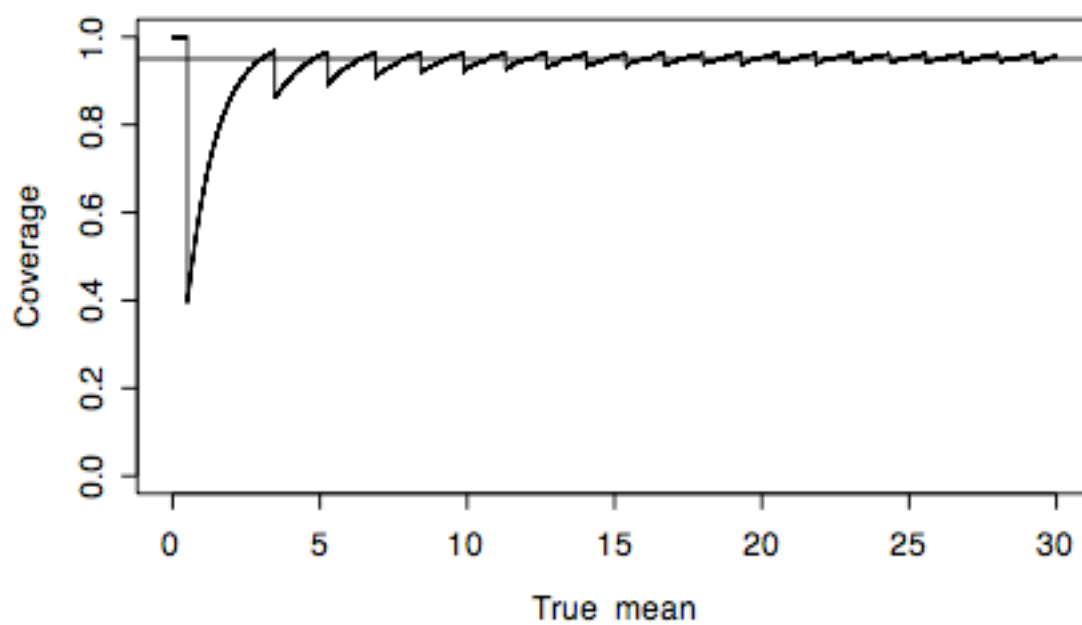
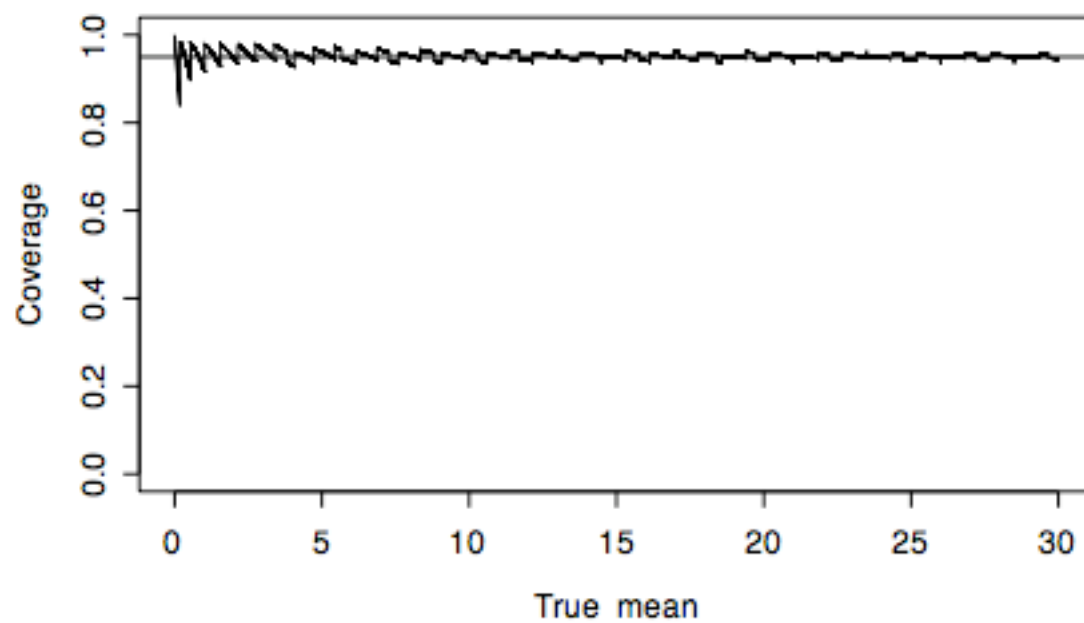


# STATS 4F03/6F03 Test #1 SOLUTIONS

## Part A

```
> coverplotpois <-  
function (fun, mumax = 30, alpha = 0.05, by = 0.001, ...)  
{  
  mugr <- seq(0, mumax, by = by)  
  plot(c(0, mumax), c(0, 1), type = "n", xlab = "True mean",  
       ylab = "Coverage")  
  abline(h = 1 - alpha)  
  lines(mugr, sapply(mugr, fun), lty = 1)  
  invisible()  
}  
> poisconfn0 <-  
function (mu = 1, maxx = 500, alpha = 0.05)  
{  
  x <- (0:maxx)  
  mulow <- x - qnorm(1 - alpha/2) * sqrt(x)  
  muup <- x + qnorm(1 - alpha/2) * sqrt(x)  
  sum(dpois(x, mu) [(mulow <= mu) & (muup >= mu)])  
}  
> poisconfn1 <-  
function (mu = 1, maxx = 500, alpha = 0.05)  
{  
  x <- (0:maxx)  
  mulow <- x - 0.5 - qnorm(1 - alpha/2) * sqrt(x)  
  muup <- x + 0.5 + qnorm(1 - alpha/2) * sqrt(x)  
  sum(dpois(x, mu) [(mulow <= mu) & (muup >= mu)])  
}  
> poisconfn2 <-  
function (mu = 1, maxx = 500, alpha = 0.05)  
{  
  x <- (0:maxx)  
  a <- qnorm(1 - alpha/2)  
  mulow <- x + a^2/2 - a * sqrt(x + a^2/4)  
  muup <- x + a^2/2 + a * sqrt(x + a^2/4)  
  sum(dpois(x, mu) [(mulow <= mu) & (muup >= mu)])  
}  
> poisconfg <-  
function (mu = 1, maxx = 200, alpha = 0.05)  
{  
  x <- (0:maxx)  
  mulow <- qgamma(alpha/2, x + 0.5)  
  muup <- qgamma(1 - alpha/2, x + 0.5)  
  sum(dpois(x, mu) [(mulow <= mu) & (muup >= mu)])  
}  
  
> coverplotpois(poisconfn0, by=0.001)  
> title(main="First normal approx, no cc")  
> coverplotpois(poisconfn1, by=0.001)  
> title(main="First normal approx with cc")  
> coverplotpois(poisconfn2, by=0.001)  
> title(main="Second normal approx, no cc")  
> coverplotpois(poisconfg, by=0.005, maxx=300)  
> title(main="Exact Poisson mid-P")
```

**First normal approx, no cc****First normal approx with cc**

**Second normal approx, no cc****Exact Poisson mid-P**