**1. Quick recap** (20 minutes, **end at 9:20**)

mathematics, 2^6, functions as factories, box, square brackets, sqrt, exp, log

**2. Distribution functions** (35 minutes, **end at 9:55**)

crisp factory rnorm

Probability density functions, paper, glance at flowchart

rexp, rgamma, data generating processes

rnorm – result of additive processes

coinflips, sample, rbinom

rpois from cumsum and cut

other additive – scales and questionnaires

more variation, beta, reparameterization of beta, beta-binomial

**3. Basic exponential curves** (5 minutes, **end at 10:00**)

exp(-x^2), exp(-x)

**4. Additive vs multiplicative, real-number domain mapping** (20 minutes, **end 10:20**)

log-normal distribution

log, exp, logit, inv\_logit, nice and smooth

natural logarithm vs other logarithms

Task: reparameterization of lognormal, find m and s for mu=175, sigma=8 (10 minutes, **end 10:30**)

**5. Faking data** (20 minutes, **end** **11:20**)

n<-52

temp<-rnorm(n,mean=8,sd=10)

a<--1500

b<-125

sigma<-200

mu<-a+b\*temp

profit<-rnorm(n,mean=mu,sd=sigma)

other examples? Exercise (20 minutes, **end 11:40**)

**6. Dumbest sampler ever** (25 minutes, **end 12:05**)

dnorm() sister of rnorm()

sapply(1:100,function(i){

a<-rnorm(1,0,1000)

b<-rnorm(1,0,100)

sigma<-rexp(1,1/500)

mu<-a+b\*temp

profit.lik<-dnorm(profit,mean=mu,sd=sigma)

return(c(a=a,b=b,sigma=sigma,lik=prod(profit.lik)))

})

winners<-sample(1:1000000,1000,replace=T,prob=H["lik",])

post<-H[,winners]

Exercise (15 minutes, **end 12:20**)

**7. Growing up:** Stan, rethinking, ulam (10 minutes, **end 12:30**)

8. Another example