

Stat141 Oct18

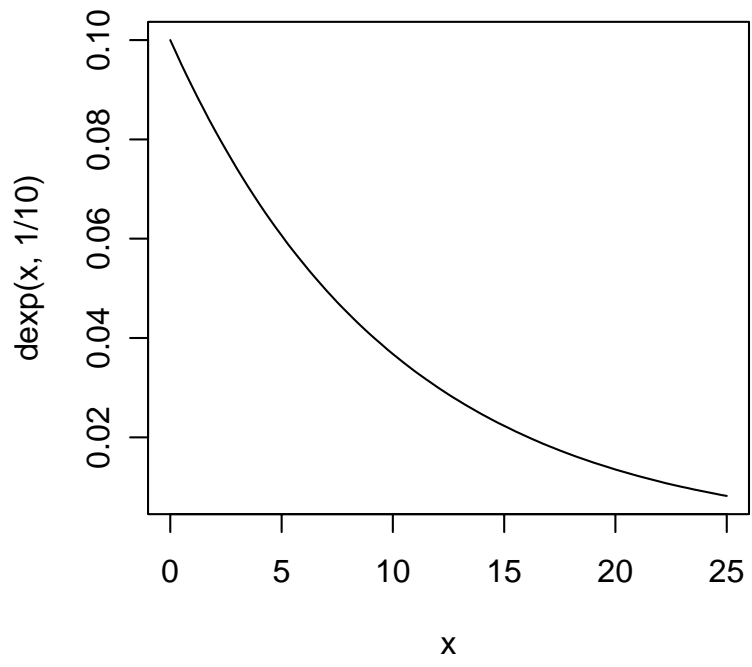
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repurpose from 10/13
> # SW Ex 4.5, Lengths of Fish (herring) N(54, 4.5)
> pnorm(60, 54, 4.5) #p.126 question (a) #percentile question
[1] 0.9087888
> #60 is 4/3 sd above the mean, text slightly low with z=1.33
> pnorm(60, 54, 4.5) - pnorm(58, 54, 4.5) # part(d) p.127
[1] 0.09582018
> qnorm(.7, 54, 4.5) #p.129 question (a) #quantile question
[1] 56.3598
#text illustrates "old-fashioned" method via N(0,1) transformation and Table 3
further calculation exs on overheads
> #female heights overhead ex N(65.5, 2.5)
> pnorm(69, 65.5, 2.5)
[1] 0.9192433
> #percentiles, really quantiles but many books are sloppy, SAT-V scores N(430,100)
> qnorm(.9, 430, 100)
[1] 558.1552
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Assessing Normality, Normal probability plots SW 4.4.; R, qqplot, qnorm
preamble: mean, sd not a good (or complete) descriptor of a sample distribution
illustrations: very different shapes can have same mean and sd
a. N(10, 2) vs U[10 - 2*sqrt(3), 10 + 2*sqrt(3)] both mean = 10 sd = 2
  > curve(dnorm(x, 10, 2), 0, 20)
  > curve(dunif(x, 10 - 2*sqrt(3), 10 + 2*sqrt(3)), 5, 15)
b. N(10, 10) vs exp(1/10) both mean = 10 sd = 10
  > curve(dexp(x, 1/10), 0, 25)
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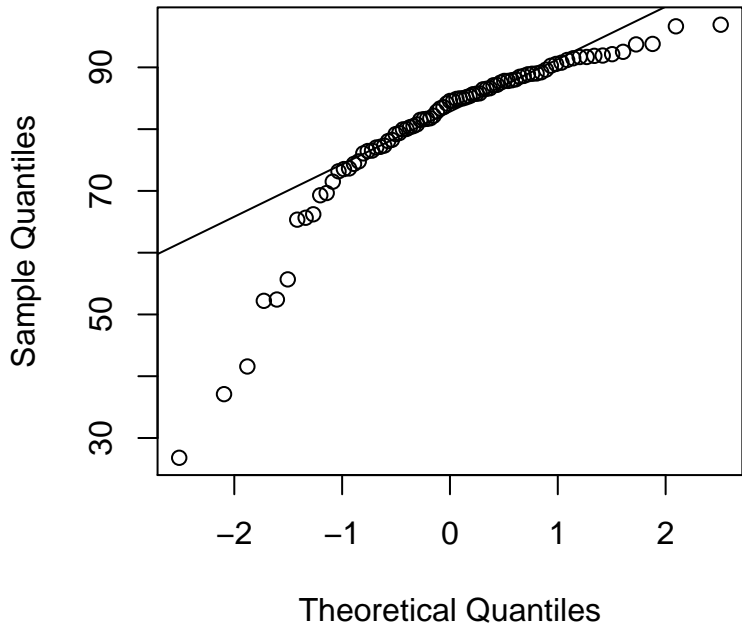
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q-q plots
SW Ex 4.8 p.134
(moisture content 83 freshwater fruits)
> fruit = read.table(file="D:\\stat141\\moisture.dat",
                    header = T)
> attach(fruit)
> quantile(percmoist)
  0%   25%   50%   75%  100%
26.800 77.085 84.570 88.550 96.910
> qqnorm(percmoist);qqline(percmoist)
> #qqline goes through quartiles,
    SW text p.137 for histogram and qq plot
```

```
#reference
> percvec = c(.1, .25, .75, .9)
> signif(qnorm(percvec, 0, 1), 3)
[1] -1.280 -0.674  0.674  1.280
```

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> #SW p.138,
ladder of transformations
log(lentil)
```



Normal Q-Q Plot



Verzani plots of q-q forms

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normal approximation to discrete distrib. via continuity correction SW 4.5  
litter size mice example table 4.1 mean 7.8, sd 2.3  
> #SW p.138, ladder of transformations log(lentil)  
> #SW sec 4.5 litter size example  
> #prob Y in [5,10] actual discrete and normal approx  
> pnorm(10, 7.8, 2.3) - pnorm(5, 7.8, 2.3)  
[1] 0.718868  
> #much smaller than actual population relative frequency .808 SW p.142  
> pnorm(10.5, 7.8, 2.3) - pnorm(4.5, 7.8, 2.3) #using continuity correction  
[1] 0.8041105  
-----  
> #normal approx to binomial, clutch failures n=100, pi = .1 approx N(10,3)  
> pbinom(9, 100, .1)  
[1] 0.4512902  
> pnorm(9,10,3); pnorm(9.5, 10,3)  
[1] 0.3694413  
[1] 0.4338162  
# continuity correction considerably improves approximation
```