STAT 400 SUMMER II 2001 (PROFESSOR GREEN)
SOLUTIONS TO PROBLEMS DUE AUGUST 7

38. $T_\circ$ has mean 2.2 and variance .98 since both are additive for independently distributed variables. $T_\circ$ takes values between 0 and 4 with probability distribution given by $p(0) = .04$, $p(1) = .2$, $p(2) = .37$, $p(3) = .3$, and $p(4) = .09$.

40.

(a) $p(0) = .125$, $p(5) = .387$, $p(10) = .488$.
(b) The distribution of M for all sample sizes is very easy to calculate. The answer is $p(0) = .5^n$, $p(5) = .8^n - .5^n$, and $p(10) = 1 - .8^n$. Clearly as n becomes large $p(10)$ approaches 1 and the others approach 0, but $\frac{p(5)}{p(0)}$ also approaches 1.

46.

(a) $\bar{X}$ is centered at 12 and has standard deviation .01.
(b) The mean is still 12, but the standard deviation is .005.
(c) The mean of the larger sample has a smaller standard deviation, and therefore clusters more tightly around the mean.

48.

(a) The standard deviation for $\bar{X}$ is .1 This gives .9876 as the desired probability.
(b) $\Phi(4.5) - \Phi(-.5) \approx 1 - .3085 = .6915$

52. 43.29

56.

(a) The mean of this distribution is 50 and the standard deviation is $\sqrt{50} = 7.071$ The desired probability is .9807.
(b) This time the mean is 250 and the standard deviation is $\sqrt{250} = 15.8112.$, and the desired probability is .