STA 110
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Fall 1995 **Name:**______________________________

Quiz 4 (Ver 1)

Bolts. A machine produces bolts which are 10% defective. Find the probability that in a random sample of 400 bolts produced by this machine (a) at most 30, (b) between 30 and 50, (c) 55 or more, of the bolts will be defective.

Example: When you roll a fair die once you expect 3.5 points with a standard deviation of 1.708. (Variance 2.918).

Estimate the probability that in 1000 rollings the total sum will be between 3500 and 3600 points.

Gain in a long run. The gain in a game is described by

X	-1	0	5
p	0.2	0.2	0.6

(a) Would you play the game? Explain.

(b) If you play the game 100 times what are the chances of ending with a negative balance?

[Sol. $EX = 2.8, VarX = 7.36$, $\sigma X = 2.71, S = X_1 + \ldots + X_{100}$, *$S$ is approx. normal (CLT),* $ES = 280, VarS = 736, \sigma S = 27.1$, $P(S < 0) = P(Z < \frac{0-280}{27.1}) = P(Z < -10.33) = 0.$*]*