In 1992, the FAA conducted 86,991 pre-employment drug tests on job applicants who were to be
engaged in safety and security-related jobs, and found that 1,143 were positive. (a) Construct a
95 percent confidence interval for the population proportion of positive drug tests.

Ans.

95% confidence interval for population proportion of positive drug tests

$p \pm 1.96\sqrt{\frac{pq}{n}} = (0.012 , 0.014)$

Where p=1143/86991 = 0.01313929 q = 1-p n = 86991

Confidence interval - proportion

95%	confidence level
0.01313929	proportion
86991	n
1.960	z
0.001	half-width
0.014	upper confidence limit
0.012	lower confidence limit

(b) Why is the
normality assumption not a problem, despite the very small value of *p*? (Data are from *Flying* 120,
no. 11 [November 1993], p. 31.)

Ans.

The distribution of p is approximately normal when n is sufficiently large. Thus if np and nq are both > 5 assumption of normality is valid .

In the above problem np= 1143 and nq= 85848 are both greater than 5 . Hence normality assumption not a problem, despite the very small value of *p*.