A survey is conducted to estimate the proportion of people in a city who support a particular policy. A random sample of 500 individuals is surveyed, and 320of them express support for the policy. Calculate a 90% confidence interval for the population proportion,

given the sample proportion. Data:

Sample size (n) =500, Number of successes (x) = 320, Confidence level = 90% Explanation: In this problem, we aim to estimate the population proportion based on the sample proportion.

By constructing a confidence interval, we provide a range of plausible values for the population proportion.

The 90%confidencelevel indicates that we are 90% confident that the true population proportion falls within the calculated interval.

| **Symbol** | **Meaning** | **Value** |
| --- | --- | --- |
| n | Sample size | 500 |
| x | Number who support the policy | 320 |
|  | Sample proportion (point estimate) | 320/500=0.64 |
|  | Normal critical value for a 90 % CI | 1.645 (because α=0.10,  α/2=0.05) |
|  | Standard error of p^ | 0.02145 |

**90 % confidence interval for the population proportion**

**Sample proportion**

**Conditions for normal approximation**

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**→ the normal approximation to the sampling distribution of ​ is valid.**

**Standard error of**

**Margin of error (MOE)**

**Confidence interval**

**So, we are 90 % confident that the true proportion of city residents who support the policy lies between 60.5 % and 67.5 %.**