Name: _____   Date: _____

Example A poll determined that 72% of people who live in Canada think that cats make good pets for the elderly. The results of this survey are considered accurate within ± 2.6 percentage points, 18 times out of 20.

a. 72% is a ___ *value* ___ and 2.6 is the _error in your survey_.
    result

b. State the confidence level (in two different ways, if possible.)

$$\frac{18^{\times 5}}{20_{\times 5}} \quad \text{or} \quad 90\%$$

c. Determine the confidence interval.

$$-2.6 \nearrow \quad 72\% \quad \searrow +2.6$$
$$69.4\% \quad - \quad 74.6\%$$

d. The population of Canada was 30 million at the time the survey was taken. State the range of the number of people who believe that cats are good pets for the elderly.

69.4% of 30 million

$$\frac{69.4}{100} \times 30\,000\,000 = 20\,820\,000$$

20 820 000 — 22 380 000

74.6% of 30 000 000

$$\frac{74.6}{100} \times 30\,000\,000$$
$$= 22\,380\,000$$

e. This survey was conducted by contacting 1020 Canadians by phone. Would you have felt any differently about the results if the pollsters had only spoken to 400 Canadians?

full population : 30 000 000
surveyed population : 1020   down to 400

0.0034%   0.0013%
⟹ decrease your confidence in the results.

Confidence Interval:
A range of values that accounts for errors.

Confidence Level:
An indication of how much of the population was sampled, how they were sampled, ...

Example To meet regulation standards, baseballs must have a mass from 142.0 g to 149.0 g. A manufacturing company has set its production equipment to create baseballs that have a mean mass of 145.0 g.

To ensure the production equipment continues to operate as expected, the quality control engineer takes a random sample of baseballs each day and measures their mass to determine the mean mass. If the mean mass of the random sample is

$$144.7g \text{ to } 145.3 \text{ g}$$

Then the production equipment is running correctly.

Confidence Level	Sample Size needed
99%	110
95%	65
90%	45

What is the confidence interval and margin of error the engineer is using for quality control tests?

$$-0.3 \quad 145 \text{ g} \quad +0.3$$

confidence 144.7 g   —   145.3 g   margin of
interval   error : ±0.3g

Interpret the table.

confidence level increases as the
Sample size increases.

What is the relationship between confidence levels and sample size?

||

— we can't get to 100% confidence unless you
are willing to sample every baseball made.