§5-6 Confidence Intervals

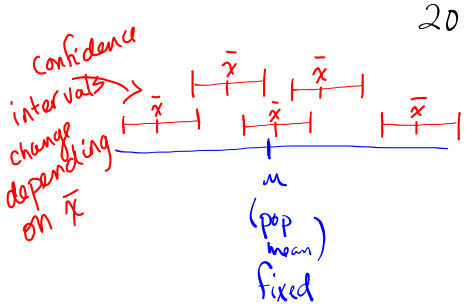
"The survey determined that 76% of people, from 18-34 years of age, have a social networking account. The results are accurate within ±4 percentage points, 19 times out of 20." (600 people randomly sampled)
(92 500 people → population)

Example 1 (p267)
What range of people have accounts and what is the certainty of the results?

Margin of error ⇒ ±4%

Confidence interval ⇒ 76% (mean) ± 4% (margin of error)
(72% to 80%)

Confidence level ⇒ 19 times / 20 times or 95%



19 samples out of 20 will contain the mean

A 95% CI indicates that 19 out 20 samples taken from the same population will produce CI's that contain the true population mean.

mean 76% of 92500 = 70300

margin of error 4% of 92500 = 3700

70300 ± 3700

66600 to 74000

75000
(if μ = 75000)

95% chance that this confidence interval Will contain the true population mean.

Example 2 (p268)

	Nanos	Ipsos	Ekos
Sample size:	844	1000	1815
margin of error	±3.4%	±3.1%	±2.3%

a) the margin of error decreases as the sample size increases.

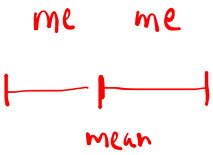
b) Confidence interval:

Nanos	Ipsos	Ekos
n = 844	n = 1000	n = 1815
margin ± 3.4%	±3.1%	±2.3%

Conservatives: $37\% \pm 3.4\%$ $(33.6 \text{ to } 40.4\%)$

Conservatives $35 \pm 3.1\%$ $(31.9 \text{ to } 38.1\%)$

Conservation.



The confidence interval is smaller when a larger sample size is used since the margin of error is smaller.

Example 3 (p270)

99% → 110 needed
95% → 65 needed
90% → 45 needed.

a) margin of error and confidence interval?

me me
$\bar{x}$

144.7g to 145.3g ← confidence interval

$\frac{0.6g}{2} = \pm 0.3g$ ← margin of error.

mean: $145g \pm 0.3g$

mean — margin of error.
confidence interval

b) the confidence level increases
+c as the sample size increases.

TO DO

① Look over Example 4 (p272)
② CYU (p274)
③ p274 | 3-6

REVIEW

① Chapter Test (p277)
② Chapter Review - READ (p278)
* note wording in last paragraph (p279) is not correct.
③ Practise (p280-282)
④ Cumulative Review (Chapters 6-7) (p520-521)

Confidence Interval

$$\bar{x} \pm z\frac{\sigma}{\sqrt{n}}$$

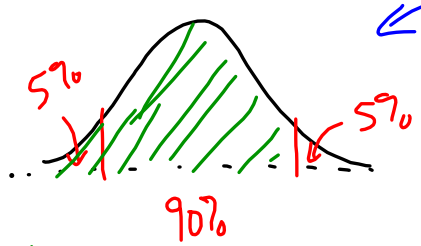
$\bar{x}$: sample mean

$z\frac{\sigma}{\sqrt{n}}$: margin of error

$\bar{x} \pm z\frac{\sigma}{\sqrt{n}}$: confidence interval

$$\text{margin of error} = z\frac{\sigma}{\sqrt{n}}$$

Where z is the confidence level



look up 95% in the z-score table

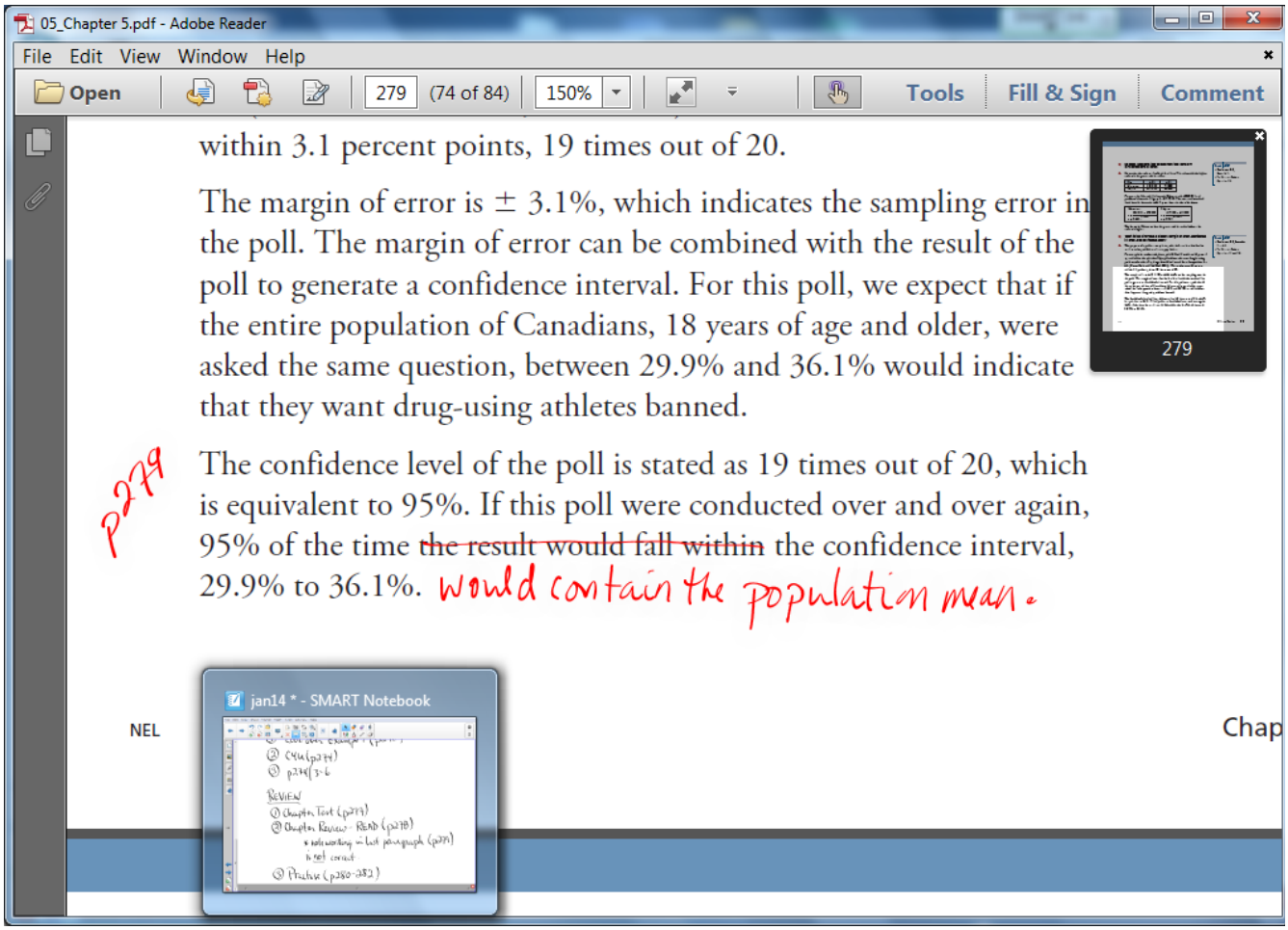
for 90% $z = 1.645$

for 95% $z = 1.96$

for 99% $z = 2.58$

σ is the population standard dev.

n is the sample size


05_Chapter 5.pdf - Adobe Reader
File Edit View Window Help
Open
279 (74 of 84)
150%
Tools
Fill & Sign
Comment
within 3.1 percent points, 19 times out of 20.
The margin of error is ± 3.1%, which indicates the sampling error in the poll. The margin of error can be combined with the result of the poll to generate a confidence interval. For this poll, we expect that if the entire population of Canadians, 18 years of age and older, were asked the same question, between 29.9% and 36.1% would indicate that they want drug-using athletes banned.
279
p279
The confidence level of the poll is stated as 19 times out of 20, which is equivalent to 95%. If this poll were conducted over and over again, 95% of the time the result would fall within the confidence interval, 29.9% to 36.1%. would contain the population mean.
jan14 * - SMART Notebook
NEL
Chap