AP STATISTICS • EXERCISE SHEET

6.9 Justifying a Claim Based on a Confidence Interval for a Difference of Population Proportions

Name: _____ Class: _____ Date: _____ **Total: 8 marks**

KEY WORDS confidence interval 置信区间

Objective

Build the skills to answer exam questions on **justifying a claim from a confidence interval for a difference of proportions**.

You must be able to:

- use a confidence interval for $p_1 - p_2$ to judge a claim
- recognise that an interval containing 0 means **no significant difference**
- interpret an interval entirely above or below 0

1 Worked examples

Study these first. Each one shows the method for a question type used later.

■ Judging a difference from the interval

A confidence interval for $p_1 - p_2$ gives the plausible values of the difference:

- if the interval **contains** 0, "no difference" ($p_1 = p_2$) is plausible;
- if the interval is entirely **positive**, $p_1 > p_2$; entirely **negative**, $p_1 < p_2$.

■ Reading a worked interval

A study reports the difference $p_1 - p_2$ as the 95% interval $(-0.02,\ 0.11)$. Because it **contains** 0, a zero difference is plausible – the data do **not** show a significant difference. Had it been $(0.03,\ 0.11)$, entirely positive, we would conclude $p_1 > p_2$.

2 Practice

2.1 State how a CI for $p_1 - p_2$ can justify a claim of no difference. [1]

2.2 A 95% CI for $p_1 - p_2$ is $(-0.03, 0.05)$. State whether "no difference" is plausible. [1]

2.3 State what a fully positive interval implies. [1]

3 Exam-style questions

3.1 A claim of "no difference" ($p_1 = p_2$) is plausible if the CI for $p_1 - p_2$ contains [1]

A B
C D

A 1
B 0
C $\hat{p}_1$
D the mean

3.2 A 95% CI for $p_1 - p_2$ is $(0.04, 0.12)$. The claim $p_1 = p_2$ is [1]

A B
C D

A supported
B not supported
C certainly true
D unknown

3.3 A 95% CI for the difference in approval between two groups is $(-0.02, 0.08)$.

(a) State whether 0 is in the interval. [1]

(b) State whether the groups differ significantly. [1]

(c) State the plausible conclusion. [1]