Lesson 10.1 Day 2: Which grade is more likely to go to Prom?

At many high schools, Prom is an annual dance that only Juniors and Seniors can purchase tickets for. The student council at a large high school is wondering if Juniors or Seniors are more likely to attend Prom. They take a random sample of 50 Juniors and find that 28 are planning on attending Prom. They select a random sample of 45 Seniors and 29 are planning on attending. Construct and interpret a 95% confidence interval for the difference in proportions of Juniors and Seniors who are planning on attending Prom.

1. What is the **point estimate** for…

   the proportion of Juniors planning on attending prom? $\widehat{p_1}$ = _____

   the proportion of Seniors planning on attending prom? $\widehat{p_2}$ = _____

   the difference in the proportion of Jrs and Srs planning on attending prom? $\widehat{p_1} - \widehat{p_2}$ = _____

2. Check the conditions needed in order to construct a confidence interval.

   Random:

   10%:

   Large Counts:

3. Construct and interpret a 95% confidence interval for the difference in proportions of Juniors and Seniors who are planning on attending prom.

General Formula:

Specific Formula:

Work:

Conclude:

4. Does the interval provide convincing evidence that Juniors have a lower proportion planning on going to prom or is it plausible that there is no difference between the two classes? Explain.

Constructing a Confidence Interval for $p_1 - p_2$

for a difference of two proportions

Important ideas:

Check Your Understanding

A Pew Research Center poll asked independent random samples of working women and men how much they value job security. Of the 806 women, 709 said job security was very or extremely important, compared with 802 of the 944 men surveyed. Construct and interpret a 95% confidence interval for the difference in the proportion of all working women and men who consider job security very or extremely important.

STATE: Parameter: Confidence level:

PLAN:

Name of procedure:

Check conditions:

DO:

General Formula:

Specific Formula:

Work:

Answer:

CONCLUDE:

Construct and interpret a confidence interval for a difference in proportions from a *randomized comparative experiment*.

BACK PAIN: Patients with lower back pain are often given nonsteroidal anti-inflammatory drugs (NSAIDs) like naproxen to help ease their pain. Researchers wondered if taking Valium along with the naproxen would affect pain relief. To find out, they recruited 112 patients with severe lower back pain and randomly assigned them to one of two treatments: naproxen and Valium or naproxen and placebo. After 1 week, 39 of the 57 subjects who took naproxen and Valium reported reduced lower back pain, compared with 43 of the 55 subjects in the naproxen and placebo group.

(a) Construct and interpret a 99% confidence interval for the difference in the proportion of patients like these who would report reduced lower back pain after taking naproxen and Valium versus after taking naproxen and placebo for a week.

(b) Based on the confidence interval in part (a), what conclusion would you make about whether taking Valium along with naproxen affects pain relief? Justify your answer.