

AP Statistics - Two Categorical Variables and Two-Way Tables - Worksheet

Common Core AP STAT 2.1, AP STAT 2.2, AP STAT 2.3, HSS-ID.B.5 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice AP Statistics topics 2.1 to 2.3. You will complete two-way tables, compute marginal, joint, and conditional relative frequencies, read segmented bar graphs, and judge association and Simpson's paradox.

AP Statistics · Common Core State Standards: **AP STAT 2.1, AP STAT 2.2, AP STAT 2.3, HSS-ID.B.5**

Exercise 1 - Explanatory and response

Name the explanatory and response variable. (a) Researchers ask whether the type of breakfast (cereal, eggs, none) is related to alertness (alert or not) in class. (b) A school asks whether the grade level affects whether students buy lunch.

Exercise 2 - Complete the table

A survey of 100 students asked whether they own a bike. Of the 40 sophomores, 24 own a bike. Of the 60 juniors, 30 own a bike. Complete a two-way table.

Exercise 3 - Marginal relative frequency

Reading \ Grade	Grade 9	Grade 10	Grade 11	Total
Reads daily	40	20	10	70
Does not	30	50	50	130
Total	70	70	60	200

Reading habit by grade.

Find the marginal relative frequency of students who read daily, and of students in Grade 10.

Exercise 4 - Joint relative frequency

Reading \ Grade	Grade 9	Grade 10	Grade 11	Total
Reads daily	40	20	10	70
Does not	30	50	50	130
Total	70	70	60	200

Reading habit by grade.

Using the table of 200 students, find the percent of all students who are in Grade 11 and do not read daily.

Exercise 5 - Conditional given a column

Reading \ Grade	Grade 9	Grade 10	Grade 11	Total
Reads daily	40	20	10	70
Does not	30	50	50	130
Total	70	70	60	200

Reading habit by grade.

Of the Grade 9 students, what percent read daily? Of the Grade 11 students?

Exercise 6 - Conditional given a row

Reading \ Grade	Grade 9	Grade 10	Grade 11	Total
Reads daily	40	20	10	70
Does not	30	50	50	130
Total	70	70	60	200

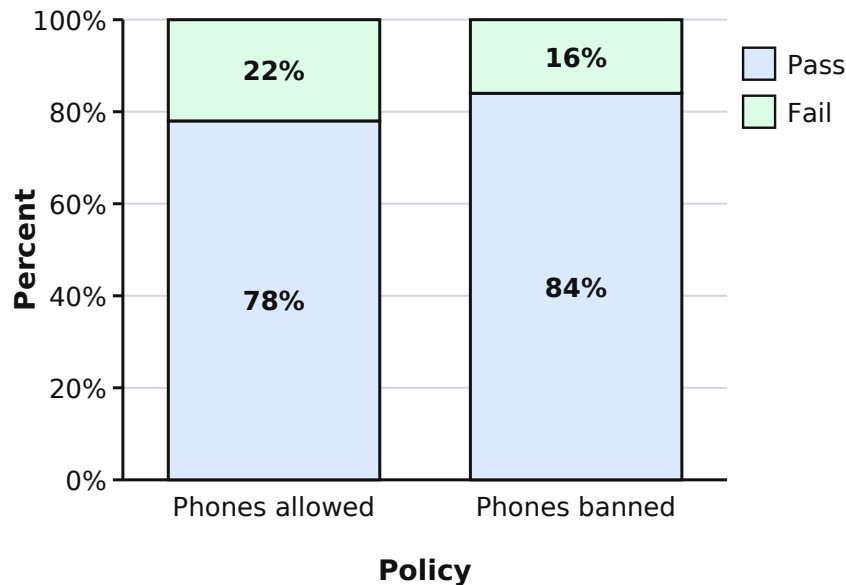
Reading habit by grade.

Of the students who read daily, what percent are in each grade?

Exercise 7 - Segmented bar graph

Make a segmented bar graph of the reading habit within each grade and describe any association.

Exercise 8 - Read a segmented bar graph



Class results under two phone policies.

The graph compares the percent of students passing a class under two phone policies (200 students each). How many in each group passed? Is there an association?

Exercise 9 - Which direction?

In a study of 500 adults, 60 of the 150 smokers and 40 of the 350 nonsmokers have a cough. Find the percent of smokers who cough and the percent of coughers who smoke.

Exercise 10 - Build a table from percents

A school has 400 students. Fifty percent are girls. Of the girls, 30% are in band; of the boys, 20% are in band. Make the two-way table of counts.

Exercise 11 - Simpson's paradox: the data

Two tutoring programs are compared by pass rates. In the easy course, Program X: 72 of 80 passed; Program Y: 10 of 10 passed. In the hard course, Program X: 2 of 20 passed; Program Y: 12 of 90 passed. Find the pass rate for each program in each course and overall.

Exercise 12 - Explain the paradox

Explain why Program X looks better overall in the previous problem even though Program Y has the higher pass rate in each course.

Exercise 13 - Association or not?

In a sample, 30% of boys and 30% of girls prefer online classes. Are sex and class preference associated? Explain.

Exercise 14 - Causation

A study finds that students who eat breakfast have a higher percent of passing grades. A news story says breakfast improves grades. Is that justified? Explain.

Exercise 15 - Pet ad

Opinion \ Owner	Cat owners	Dog owners	Total
Likes	48	32	80
Dislikes	12	108	120
Total	60	140	200

Opinion of a pet-store ad.

Some owners rated a pet-store ad. Find the percent of cat owners who like the ad and the percent of dog owners who like it. Is there an association?

Exercise 16 - Describe the association

Write two sentences describing the association in the pet-ad table using conditional percents.

Exercise 17 - Fill in with totals

A survey of 250 people shows 140 are female. Of 90 people who prefer tea, 63 are female. Find the number of males who prefer coffee (assuming only tea or coffee).

Exercise 18 - Expected counts preview

If sex and drink preference were unrelated, the percent of females preferring tea would equal the overall percent preferring tea (90 of 250). Find the expected number of females who prefer tea among the 140 females, and compare with 63.

Exercise 19 - Multi-step

A county reports that 1,200 of 4,000 teenagers vape. Among the 1,500 teens from rural areas, 540 vape. Find the percent of rural teens who vape and of non-rural teens who vape.

Exercise 20 - Percent of a group

At a school, 35% of the 600 students ride the bus. Of the bus riders, 40% are in grade 9. How many bus riders are in grade 9, and what percent of all students is that?