

Probability and Statistics: math practice, Grade 11 – download the PDF

22 problems graded by difficulty (★ easy, ★★ medium, ★★★ hard). Try first, without looking at the solutions!

1 Lunch combinations

★ ★ ★

A cafeteria offers 5 sandwiches, 4 drinks and 3 sides. A lunch is one sandwich, one drink and one side. How many different lunches are possible?

2 Factorial arithmetic

★ ★ ★

Compute $6!$, $\frac{8!}{6!}$, $P(7, 2)$ and $C(7, 2)$.

3 Bike lock

★ ★ ★

A bike lock has 4 dials, each with digits 0 to 9. How many codes are possible (a) if digits may repeat, (b) if all four digits must be different?

4 Pizza toppings

★ ★ ★

A pizza shop has 9 toppings. How many different 3-topping pizzas can you order? Does order matter here?

5 Coin and die



You flip a fair coin and roll a fair six-sided die. What is the probability of heads and an even number?

6 Tea or coffee



Sixty people were asked about their favorite drink.

	Under 30	30 or older
Tea	9	11
Coffee	21	19

(a) Given that a person is under 30, what is the probability they prefer coffee? (b) Given that a person is 30 or older, what is the probability they prefer tea?

7 Heights and the empirical rule



Adult heights in a town are normally distributed with mean 66 inches and standard deviation 3 inches. (a) Between what heights do about 68% of adults fall? (b) About 95%? (c) About what percent are taller than 72 inches?

8 Books on a shelf



Five different books are placed in a row on a shelf. In how many ways can this be done if two particular books must stay side by side?

9 Choosing a committee



A club has 4 girls and 5 boys. A committee must have 2 girls and 2 boys. How many committees are possible?

10 Two aces



Two cards are drawn from a standard 52-card deck without replacement. What is the probability that both are aces?

11 Exactly one red



A bag has 6 red and 4 green marbles. Two are drawn without replacement. Find the probability of exactly one red marble.

12 Guessing on a quiz



A student guesses every answer on an 8-question true/false quiz. Find the probability of exactly 6 correct answers.

13 Expanding a binomial



Use the binomial theorem to expand $(x - 3)^4$.

14 Standard deviation by hand



Find the mean and population standard deviation of 1, 3, 3, 3, 4, 4, 6, 8.

15 Which test was better?

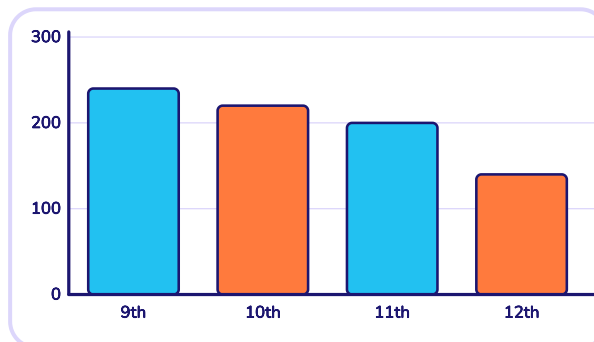


Maya scored 82 on a test with mean 70 and standard deviation 8. Her brother scored 31 on a different test with mean 25 and standard deviation 3. Compare the two performances using z-scores.

16 Stratified sample



A school has the enrollment shown below. The principal wants a stratified random sample of 80 students, proportional to each grade's size.



How many students should be chosen from each grade?

17 Letters of STATISTICS



How many different arrangements of all the letters of the word STATISTICS are there?

18 A screening test



In a town, 2% of 1,000 people have a condition. The test is positive for 90% of people who have it and, wrongly, for 5% of people who do not. A person tests positive. What is the probability they actually have the condition?

19 Defective parts



Each part from a machine is defective with probability 0.1, independently. A box holds 10 parts. Find (a) the probability that at least one is defective, (b) the probability that exactly 2 are defective, (c) the mean and standard deviation of the number of defective parts.

20 Coefficients



In the expansion of $(2x + 1)^6$, find (a) the coefficient of x^3 , (b) the sum of all the coefficients.

21 Polling margin of error



In a random sample of 625 residents, 64% favor a new bike lane. (a) Compute the 95% margin of error. (b) Give the confidence interval. (c) How large a sample is needed for a margin of error of at most 3% when nothing is known about the proportion (use $\hat{p} = 0.5$)?

22 Battery life



Battery life is normally distributed with mean 40 hours and standard deviation 5 hours. Use the empirical rule. (a) What percent last between 30 and 50 hours? (b) What percent last more than 45 hours? (c) Out of 2,500 batteries, how many are expected to last between 35 and 50 hours?



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Speed drill for Grade 11: how many in 60 seconds?



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