

Name Key

Total 12 points

Please show all your work.

1. (5 pts) Test scores for a physics class had a mean of 70 with a standard deviation of 4. Test scores for a sociology class had a mean of 81 with a standard deviation of 5. Suppose you get a 76 on the physics exam and a 88 on the sociology exam.

Calculate the z score for each exam. Then, decide on which test did you perform better.

$$z_{ph} = \frac{76 - 70}{4} = 1.5$$

$$z_{soc} = \frac{88 - 81}{5} = 1.4$$

Physics

2. (5 pts) The probability of passing the anatomy class is 0.75.

a) Find the probability that a randomly chosen student from the anatomy class will fail the class.

$$p = 1 - 0.75 = 25\%$$

b) If 3 students from the class are randomly selected, find the probability that all three will pass the class.

$$0.75^3 \approx 0.422 = 42.2\%$$

c) If 3 students from the class are randomly selected, find the probability that at least one of those three will pass the class.

$$P = 1 - P(\text{All 3 fail the class}) = 1 - 0.25^3 \approx 0.984 = 98.4\%$$

3. (2 pts) You are dealt three cards successively without replacement from a standard deck of 52 playing cards. Find the probability that the first two cards are a four, and the third card is a king.

$$P = \frac{4}{52} \times \frac{3}{51} \times \frac{4}{50} = 0.000376 = 0.0376\%$$

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1. (5 pts) The mean height for men in the US is 5 feet 10 inches with a standard deviation of 3 inches. The mean height for women in the US is 5 feet 4 inches with a standard deviation of 4 inches. If Mike is 6 feet tall and Jane is 5 feet 7 inches tall, who is taller with respect to other people of the same sex (i.e. whose height corresponds to a higher percentile)?

$$Z_{\text{MIKE}} = \frac{6'0'' - 5'10''}{3''} = \frac{2}{3} = 0.67 = 67\%$$

$$Z_{\text{JANE}} = \frac{5'7'' - 5'4''}{4''} = \frac{3}{4} = 0.75 = 75\%$$

2. (5 pts) The probability that a person in the U.S. has type O+ blood is 38%.

a) Find the probability that a randomly chosen person in the U.S. does not have type O+.

$$P = 1 - .38 = .62 = 62\%$$

b) If four unrelated people in the U.S. are selected at random, find the probability that all four have O+.

$$P = 0.38^4 = 0.0209 = 2.09\%$$

c) If three unrelated people in the U.S. are selected at random, find the probability that at least one of the three has type O+.

$$P = 1 - P(\text{no one has type O+}) = 1 - .62^3 = .762 = 76.2\%$$

3. (2 pts) Four people are selected at random. Find the probability that all four are born on a different day of the week.

$$\frac{7}{7} \times \frac{6}{7} \times \frac{5}{7} \times \frac{4}{7} = .35 = 35\%$$