

Exercise 2C.1

Suppose scores on a certain standardized test are normalized so that they follow the normal distribution with mean 0 and variance 1.

(a) What is the probability that a randomly selected exam taker gets a score greater than 2?

ANSWER: 0.0228

$$P(Z > 2) = 0.0228 \text{ (Normal Table, Column B)}$$

(b) What is the probability that a randomly selected exam taker gets a score lower than -3.5?

ANSWER: 0.0002

$$P(Z < -3.5) = P(Z > 3.5) = 0.0002 \text{ (Column B)}$$

(c) What is the probability that a randomly selected exam taker gets a score between -1 and +1?

ANSWER: 0.6826

$$\begin{aligned} P(-1 < Z < 1) &= P(Z < 1) - P(Z < -1) \\ &= P(Z < 1) - P(Z > 1) = 0.8413 - 0.1587 = 0.6826 \text{ (Columns A and B)} \end{aligned}$$

(d) What is the probability that a randomly selected exam taker gets a score either greater than 2 or less than -2?

ANSWER: 0.0456

$$\begin{aligned} P(Z < -2 \text{ OR } Z > 2) &= P(Z < -2) + P(Z > 2) \\ &= P(Z > 2) + P(Z > 2) = 2 \times P(Z > 2) = 2 \times 0.0228 = 0.0456 \end{aligned}$$