**5.3 The Normal Distribution (Part B)**

**Z-Scores**

Standard normal distribution

Z – score

Ex. Hailey belongs to a running club in Vancouver. Below are normally distributed times for the 200 metre sprint in Vancouver and on a recent trip to Lake Louise.

|  |  |  |  |
| --- | --- | --- | --- |
| **Location** | **Club Mean Time for 200m** | **Club Standard Deviation** | **Hailey’s Run Time** |
| Vancouver | 25.75 seconds | 0.62 seconds | 24.95 seconds |
| Lake Louise | 25.57 seconds | 0.60 seconds | 24.77 seconds |

At which location was Hailey’s run time better, when compared with the club results?

Ex. IQ (intelligence) scores are normally distributed with a mean of 100 and a standard deviation of 15. If a person scores 119 on an IQ test, how does this score compare with the scores of the general population?

Ex. Molly earned a score of 940 on a national achievement test. The mean test score was 850 with a standard deviation of 100. What proportion of students had a higher score than Molly? (Assume that test scores are normally distributed.)

Ex. Running shoes lose their shock-absorption after a mean distance of 640km, with a standard deviation of 160km. Zack is an elite runner and wants to replace his shoes at a distance when only 25% of people would replace their shoes. At what distance should he replace his shoes?