Introduction to Statistics
Activity 3.3e **SOLUTIONS**

Incubation Durations

Suppose the incubation times (time from exposure to symptoms) for a certain virus follow a **mound-shaped** distribution with a **mean** of **8.0 days** and a **standard deviation** of **1.5 days**.

a) Approximately what percentage of incubation times are between **6.5 days** and **9.5 days**?

6.5 = 8.0 − 1.5 = $\mu - 1\sigma$ and 9.5 = 8.0 + 1.5 = $\mu + 1\sigma$. This interval is within 1 standard deviation of the mean. By the Empirical Rule, about 68% of values in a mound-shaped distribution lie within 1 standard deviation of the mean.

Answer: Approximately 68%.

b) Between what two values will the incubation times of **95%** of all infected people fall?

By the Empirical Rule, 95% of values lie within 2 standard deviations of the mean.
$8.0 \pm 2(1.5) = 8.0 \pm 3.0 \rightarrow$ 5.0 to 11.0 days.

Answer: About 5.0 to 11.0 days.

Suppose also that the incubation times for a different virus follow a **mound-shaped** distribution with a **mean** of **12.0 days** and a **standard deviation** of **0.8 days**.

c) Is Virus A (mean 8.0, SD 1.5) or Virus B (mean 12.0, SD 0.8) more likely to have an incubation time that lasts within **±1 day** of its mean? Explain briefly.

For Virus A: $z = 1 / 1.5 \approx 0.67$ standard deviations.
For Virus B ($\sigma = 0.8$): $z = 1 / 0.8 = 1.25$ standard deviations.

Because ±1 day represents more standard deviations for Virus B, a larger percentage of its values fall in that interval.

Answer: Virus B is more likely to be within ±1 day of its mean.