

# Lesson 5: Normal Distribution

## Preparation

### Solutions

Please note that the steps show rounded numbers, but that the final answers to the problems are calculated without rounding.

Problem	Part	Solution
1	A	0.19- Unusual ( $z = -2.088$ )
1	B	0.225- Not Unusual ( $z = -1.059$ )
1	C	0.325- Not Unusual ( $z = 1.882$ )
1	D	0.335- Unusual ( $z = 2.176$ )
2	-	The probability that a randomly selected professional baseball player will have a batting average that is greater than 0.335 is 0.015.
3	-	The Normal Density curve is symmetric and has a bell shape. It is determined by its mean and standard deviation.
4	-	z: tells how many standard deviations away from the mean a certain observation lies. x: an observed data point. $\mu$ : mean of the population. $\sigma$ : standard deviation of the population.
5	-	For any bell-shaped distribution, 68% of the data will lie within 1 standard deviation of the mean, 95% of the data will lie within 2 standard deviations of the mean, and 99.7% of the data will lie within 3 standard deviations of the mean. This is called the 68-95-99.7% Rule for Bell-shaped Distributions. Needs to be at least three sentences.
6	A	$\mu = 150.8$ $\sigma = 8.8$
6	B	$P(X > 165) = P(z > 1.6136) = 0.0533$
6	C	$z = -1.2816$ ; this is Not Unusual. See question 1.
6	D	GRE score = 139.5, which rounds to 140.
7	A	$\mu = 1800$ $\sigma = 600$
7	B	$P(X > 2500) = P(z > 1.1667) = 0.1217$
7	C	$P(X < 2500) = P(z < 1.1667) = 0.8783$ This answer is easier to get by subtracting the answer to part (a) from 1.
7	D	$P(X < 1500) = P(z < -0.5) = 0.3085$
7	E	$P(1500 < X < 2500) = 0.5698$
7	F	$3^{rd}$ quartile of the speeds of hydrogen = $2204.4 \frac{m}{s}$
8	A	Not normal
8	B	Not Normal
8	C	Normal
8	D	Normal
8	E	Not Normal
8	F	Normal