Let's analyze each interpretation based on the statistical principles involved in constructing and interpreting a 95% confidence interval:

\*\*Item 28: "We are 95% confident that the true average number of chocolate chips per cookie lies between 18.6 and 21.3."\*\*

- \*\*Analysis:\*\* This statement correctly reflects the interpretation of a 95% confidence interval. It states that if we were to repeat the process of sampling and interval estimation many times, in 95% of those instances, the calculated interval would contain the true population mean.

- \*\*Answer:\*\* (A) Valid

\*\*Item 29: "There is a 95% probability that the true average number of chocolate chips per cookie is between 18.6 and 21.3."\*\*

- \*\*Analysis:\*\* This statement is subtly different from the correct interpretation. Once the interval is calculated, the true population mean is either within this interval or it isn't; there's no probability involved with this fixed interval. The 95% refers to the method's long-run frequency of capturing the true mean, not to the probability of the true mean being in this specific interval.

- \*\*Answer:\*\* (B) Invalid

\*\*Item 30: "95% of the cookies in the population contain between 18.6 and 21.3 chocolate chips."\*\*

- \*\*Analysis:\*\* This statement misinterprets the confidence interval. The interval provides information about the population mean, not about the distribution of individual cookies. It does not say anything about the percentage of cookies within the population that have a certain number of chips.

- \*\*Answer:\*\* (B) Invalid

\*\*Item 31: "If we took another random sample of cookies, there is a 95% chance that the sample mean would fall between 18.6 and 21.3."\*\*

- \*\*Analysis:\*\* This interpretation is incorrect because the confidence interval does not predict where the sample mean of a new sample would fall. It's about the interval's ability to capture the true population mean, not about predicting future sample means.

- \*\*Answer:\*\* (B) Invalid

These responses reflect a high level of understanding typical of a graduate statistics student, focusing on the correct interpretation of confidence intervals and avoiding common misconceptions.