Lesson 7 Summary

We can use a double number line diagram to show information about percent increase and percent decrease:

\[
\text{cereal (grams)} \quad 0 \quad 100 \quad 200 \quad 300 \quad 400 \quad 500 \quad 600 \quad 700
\]
\[
0\% \quad 20\% \quad 40\% \quad 60\% \quad 80\% \quad 100\% \quad 120\% \quad 140\%
\]

The initial amount of cereal is 500 grams, which is lined up with 100% in the diagram. We can find a 20% increase to 500 by adding 20% of 500:

\[
500 + (0.2) \cdot 500 = (1.20) \cdot 500 = 600
\]

In the diagram, we can see that 600 corresponds to 120%.

If the initial amount of 500 grams is decreased by 40%, we can find how much cereal there is by subtracting 40% of the 500 grams:

\[
500 - (0.4) \cdot 500 = (0.6) \cdot 500 = 300
\]

So a 40% decrease is the same as 60% of the initial amount. In the diagram, we can see that 300 is lined up with 60%.

To solve percentage problems, we need to be clear about what corresponds to 100%. For example, suppose there are 20 students in a class, and we know this is an increase of 25% from last year. In this case, the number of students in the class last year corresponds to 100%. So the initial amount (100%) is unknown and the final amount (125%) is 20 students.

\[
\text{number of students} \quad 0 \quad 4 \quad 8 \quad 12 \quad 16 \quad 20 \quad 24 \quad 28
\]
\[
0\% \quad 25\% \quad 50\% \quad 75\% \quad 100\% \quad 125\% \quad 150\% \quad 175\%
\]

Looking at the double number line, if 20 students is a 25% increase from the previous year, then there