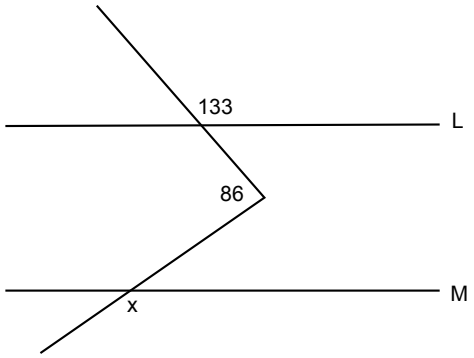
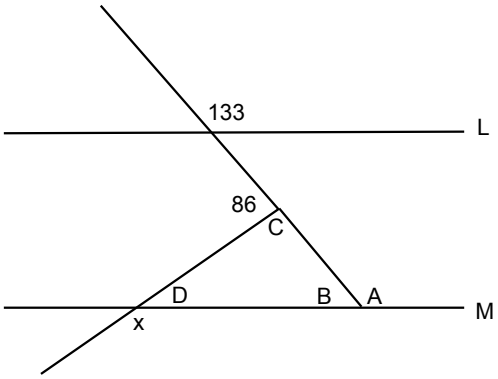
# Problem of the Week
# Solution Two

**In the diagram below, lines $L$ and $M$ are parallel. Given the two angles as marked, find the measure of angle $x$.**




SOLUTION: The measure of angle $x$ is $141$.

We can extend extend the positively-sloped line as shown to the left, below:




It is a basic fact about parallel lines that angle $A$ must be $133$. Since $A$ and $B$ together make a straight line, they must add up to $180$. We conclude that angle $B$ is $47$. Since angle $C$ makes a straight line with $86$, we conclude that its measure is $94$.

Next, recall that the angles of a triangle add up to $180$. Since $B + C = 47 + 94 = 141$, we conclude that angle $D$ is $39$. And since $x$ and $D$ make a straight line, we see that $x = 141$ as well.

Perhaps you have noticed that $x = B + C$. This is a specific example of something called the "exterior angle theorem," which states that an exterior angle of a triangle is equal to the sum of the two remote interior angles. We could have used that theorem in our solution, to skip the step where we needed to find $D$. However, that was more sophisticated machinery than I wanted to use.