**Bisection Method**

Write the **R** function `bisection.r` that calculates the root of the user-defined function $f$ on a closed interval $[A, B]$ using the Bisection Method.

Inputs:

1. $A$ - the left endpoint of the interval.
2. $B$ - the right endpoint of the interval.
3. $t$ - a user-defined tolerance

Output: $x$ - a close approximation of a root of the function $f$ on the closed interval between $a$ and $b$.

Basically, the algorithm calculates the midpoint $M$ between $A$ and $B$. If $f(M)$ has the same sign as $f(A)$, then the root must be between $M$ and $B$. Therefore, set $A$ equal to $M$. On the other hand, if $f(M)$ does not have the same sign as $f(A)$, then the root must be between $A$ and $M$. In this case, set $B$ equal to $M$. Repeat.

How long do you repeat the algorithm?

You continue while $|B - A| > t$ and $\frac{2\times|B-A|}{|A|+|B|} > t$.

You must check to see whether $f(A)$ and $f(B)$ have opposite signs. If they have the same sign (so there is no guarantee that there is a root between $A$ and $B$), then return `NA` and print an error message.

Good luck. Here are several examples. For the first two examples, $f(x) = \cos(x) - 0.80 + 0.10x^2$. For the third example, $f(x) = -\sin(x) + x/50$. And, for the last two examples, $f(x) = (x-3)^5$.

```
> bisection(0,pi,0.001)
[1] 0.7267234
> bisection(0,pi,0.000001)
[1] 0.7270473
> bisection(pi/2,pi,0.0001)
[1] 3.079946
> bisection(0,5,0.0001)
[1] 2.999954
> bisection(0,2,0.0001)
Error, f(A) and f(B) must have different signs.
[1] NA
```