Reverse Mode Automatic Differentiation

```
1  md"# Reverse Mode Automatic Differentiation"
```

Load Package

```
1  md"## Load Package"
```

```
1  using ReverseDiff
```

Define Function

```
1  md"## Define Function"
```

f (generic function with 1 method)
```
1  f(A, B) = sum(A' * B + A * B')
```

Generate Inputs by using Random Numbers

```
1  md"## Generate Inputs by using Random Numbers"
```

(100×100 Matrix{Float64}:   , 100×100 M
 0.803486   0.0580428   0.606378   0.78744   …   0.218229   0.776961   0.481286   0.971548

```
1  A, B = rand(100, 100), rand(100, 100)
```

c = 502534.04638828523
```
1  c = f(A, B)
```

inputs =
(100×100 Matrix{Float64}:   , 100×100 M
 0.803486   0.0580428   0.606378   0.78744   0.218229   0.776961   0.481286   0.971548

```
1  inputs =(A, B)
```

Find Gradient

```
1  md"## Find Gradient"
```

Note: Conceptually, a Gradient is the same as a Derivative, but the term Gradient is typically used for functions with several inputs and a single output.

```
1  md"""
2  Note: Conceptually, a Gradient is the same as a Derivative, but the term Gradient is
   typically used for functions with several inputs and a single output.
   """
3
```

```
(100×100 Matrix{Float64}:                                           ,  100×
  98.7813    98.9791    94.9814    98.8735   …   101.17    101.168    97.2497  100.106    104
```

```
1  ReverseDiff.gradient(f, inputs)
```