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In [1]: import numpy as np
import pandas as pd
import sympy as sym
import matplotlib as pyplot
from matplotlib import pyplot
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In [2]: def objective(x):
return (x+3)**2
```

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In [3]: def derivative(x):
return 2*(x+3)
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In [4]: def gradient(alpha,start,max_iter):
x_list=list()
x=start
x_list.append(x)
for i in range(max_iter):
    gradi=derivative(x)
    x=x-(alpha*gradi)
    x_list.append(x)
return x_list
x=sym.symbols('x')
expr=(x+3)**2.0
grad=sym.Derivative(expr,x)
print("{}".format(grad.doit()))
grad.doit().subs(x,2)
```

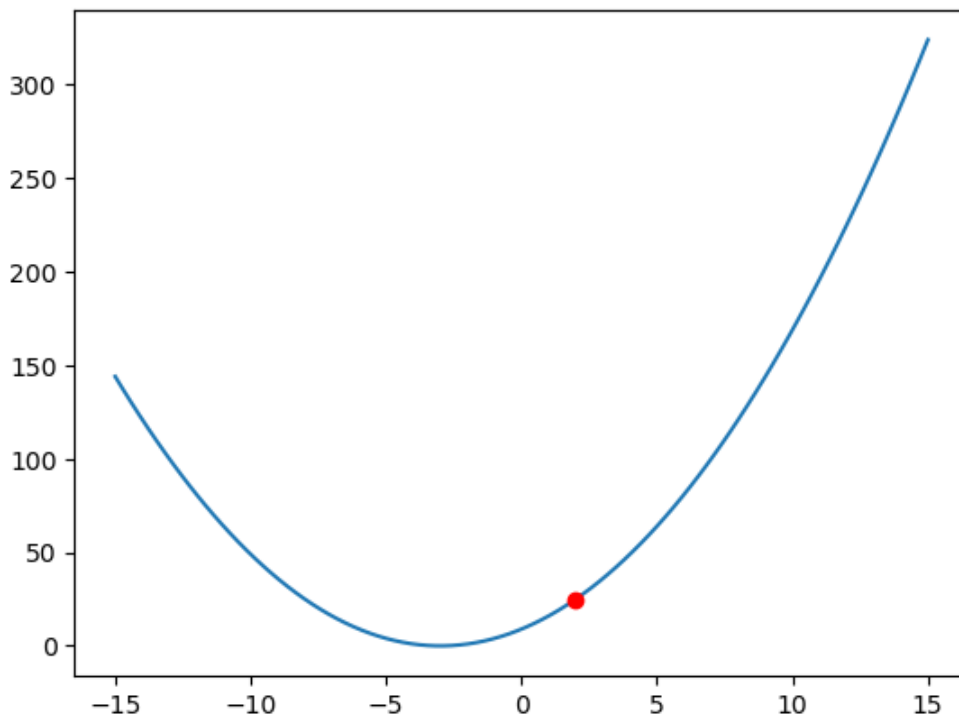
2.0*(x + 3)**1.0

Out[4]: 10.0

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In [5]: alpha=0.1
start=2
max_iter=30
x=sym.symbols('x')
expr=(x+3)**2
```

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In [6]: x_cor=np.linspace(-15,15,100)
pyplot.plot(x_cor,objective(x_cor))
pyplot.plot(2,objective(2),'ro')
```

Out[6]: [<matplotlib.lines.Line2D at 0x24494ac3e50>]



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In [7]: x=gradient(alpha,start,max_iter)
x_cor=np.linspace(-5,5,100)
pyplot.plot(x_cor,objective(x_cor))

x_arr=np.array(x)
pyplot.plot(x_arr,objective(x_arr),'.-',color='red')
pyplot.show()
```

