***Romberg rule– Integration method***

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Source: Numerical Analysis: Richard L.Burden,J. Douglas Faires.ninth Edition

***Romberg rule* – Code in python:**

def romberg(f, a, b, n):  
 r = []  
 h = b - a  
 r.append([(h / 2.0) \* (f(a) + f(b))])  
 for i in range(1, n + 1):  
 h = h / 2.  
 sum = 0  
 for k in range(1, 2 \*\* i, 2):  
 sum = sum + f(a + k \* h)  
 rowi = [(0.5 \* (r[i - 1][0])) + sum \* h]  
 for j in range(1, i + 1):  
 rij = rowi[j - 1] + (rowi[j - 1] - r[i - 1][j - 1]) / (4. \*\* j - 1.)  
 rowi.append(rij)  
 r.append(rowi)  
 return r  
print(romberg(lambda x: -x \*\* 2 + 10 \* x - 16, 2, 8, 10))

**Function example: -x^2 +10x -16**

**F – function**

**A – Left-end range**

**B – Right-end range**

**N - number of Intervals**

**Results of code :**

**([0.0])**

**([27.0, 36.0])**

**([33.75, 36.0, 36.0])**

**([35.4375, 36.0, 36.0, 36.0])**

**([35.859375, 36.0, 36.0, 36.0, 36.0])**

**([35.96484375, 36.0, 36.0, 36.0, 36.0, 36.0])**

**([35.9912109375, 36.0, 36.0, 36.0, 36.0, 36.0, 36.0])**

**([35.997802734375, 36.0, 36.0, 36.0, 36.0, 36.0, 36.0, 36.0])**

**([35.99945068359375, 36.0, 36.0, 36.0, 36.0, 36.0, 36.0, 36.0, 36.0])**

**([35.99986267089844, 36.0, 36.0, 36.0, 36.0, 36.0, 36.0, 36.0, 36.0, 36.0])**

**([35.99996566772461, 36.0, 36.0, 36.0, 36.0, 36.0, 36.0, 36.0, 36.0, 36.0, 36.0])]]**