Lab Practical: Taylor Strickler

In [ ]:
```
Question #1
```

In [1]:
```
n(e^pi+2*(5+2))
```

Out[1]: 37.1406926327793

In [ ]:
```
Question #2
```

In [3]:
```
g(x)=(2*x^2-6*x-5)/(x-3)
solve(g == 0,x)
```

Out[3]: [x == -1/2*sqrt(19) + 3/2, x == 1/2*sqrt(19) + 3/2]

In [5]:
```
find_root(g ==0, -5, 0)
```

Out[5]: -0.6794494717703368

In [6]:
```
g(0)
```

Out[6]: 5/3

In [7]:
```
solve(g > 0, x)
```

Out[7]: [[x > -1/2*sqrt(19) + 3/2, x < 3], [x > 1/2*sqrt(19) + 3/2]]

In [8]:
```
solve(g< 0, x)
```

Out[8]: [[x < -1/2*sqrt(19) + 3/2], [x > 3, x < 1/2*sqrt(19) + 3/2]]

In [9]:
```
solve( diff(g, x) > 0, x)
```

Out[9]: [[x < 3], [x > 3]]

In [10]:
```
solve( diff(g, x) < 0, x)
```

Out[10]: []

In [11]:
```
solve( diff(g, x) == 0, x)
```

Out[11]: [x == -1/2*I*sqrt(10) + 3, x == 1/2*I*sqrt(10) + 3]

In [12]:
```
g2 = diff(g, x, 2)
g2(0)
```

Out[12]: 10/27

In [ ]:
```
Question #3
```

In [16]:
```
x=var('x')
```

In [23]:
```
def f(x): return cos(x)*e^-x^2
a, b = 1,5
n = 100
```

In [24]:
```
print([i for i in range(n)])
print([i/2 + 1 for i in range(n)])
```

```
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 2
1, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 4
0, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 5
9, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 7
8, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 9
7, 98, 99]
[1, 3/2, 2, 5/2, 3, 7/2, 4, 9/2, 5, 11/2, 6, 13/2, 7, 15/2, 8, 17/2, 9, 19/2,
10, 21/2, 11, 23/2, 12, 25/2, 13, 27/2, 14, 29/2, 15, 31/2, 16, 33/2, 17, 35/
2, 18, 37/2, 19, 39/2, 20, 41/2, 21, 43/2, 22, 45/2, 23, 47/2, 24, 49/2, 25,
51/2, 26, 53/2, 27, 55/2, 28, 57/2, 29, 59/2, 30, 61/2, 31, 63/2, 32, 65/2, 3
3, 67/2, 34, 69/2, 35, 71/2, 36, 73/2, 37, 75/2, 38, 77/2, 39, 79/2, 40, 81/
2, 41, 83/2, 42, 85/2, 43, 87/2, 44, 89/2, 45, 91/2, 46, 93/2, 47, 95/2, 48,
97/2, 49, 99/2, 50, 101/2]
```

In [25]:
```
x_n = [a + (b-a)/n*i for i in range(n+1)]
print(x_n)
```

```
[1, 26/25, 27/25, 28/25, 29/25, 6/5, 31/25, 32/25, 33/25, 34/25, 7/5, 36/25,
37/25, 38/25, 39/25, 8/5, 41/25, 42/25, 43/25, 44/25, 9/5, 46/25, 47/25, 48/2
5, 49/25, 2, 51/25, 52/25, 53/25, 54/25, 11/5, 56/25, 57/25, 58/25, 59/25, 1
2/5, 61/25, 62/25, 63/25, 64/25, 13/5, 66/25, 67/25, 68/25, 69/25, 14/5, 71/2
5, 72/25, 73/25, 74/25, 3, 76/25, 77/25, 78/25, 79/25, 16/5, 81/25, 82/25, 8
3/25, 84/25, 17/5, 86/25, 87/25, 88/25, 89/25, 18/5, 91/25, 92/25, 93/25, 94/
25, 19/5, 96/25, 97/25, 98/25, 99/25, 4, 101/25, 102/25, 103/25, 104/25, 21/
5, 106/25, 107/25, 108/25, 109/25, 22/5, 111/25, 112/25, 113/25, 114/25, 23/
5, 116/25, 117/25, 118/25, 119/25, 24/5, 121/25, 122/25, 123/25, 124/25, 5]
```

In [28]:
```
sum([1, 26/25, 27/25, 28/25, 29/25, 6/5, 31/25, 32/25, 33/25, 34/25, 7/5, 36/2
5, 37/25, 38/25, 39/25, 8/5, 41/25, 42/25, 43/25, 44/25, 9/5, 46/25, 47/25, 48
/25, 49/25, 2, 51/25, 52/25, 53/25, 54/25, 11/5, 56/25, 57/25, 58/25, 59/25, 1
2/5, 61/25, 62/25, 63/25, 64/25, 13/5, 66/25, 67/25, 68/25, 69/25, 14/5, 71/25
, 72/25, 73/25, 74/25, 3, 76/25, 77/25, 78/25, 79/25, 16/5, 81/25, 82/25, 83/2
5, 84/25, 17/5, 86/25, 87/25, 88/25, 89/25, 18/5, 91/25, 92/25, 93/25, 94/25,
19/5, 96/25, 97/25, 98/25, 99/25, 4, 101/25, 102/25, 103/25, 104/25, 21/5, 106
/25, 107/25, 108/25, 109/25, 22/5, 111/25, 112/25, 113/25, 114/25, 23/5, 116/2
5, 117/25, 118/25, 119/25, 24/5, 121/25, 122/25, 123/25, 124/25, 5])
```

Out[28]: 303