1-1 （拉格朗日插值）利用 100,121,144 的开方值求 sqrt(115)

In [5]:

```python
x = [100.0, 121.0, 144.0]
y = [10.0, 11.0, 12.0]

a = 115
result = 0.0

for i in range(3):
    t = 1.0
    for j in range(3):
        if j != i:
            t *= (a - x[j]) / (x[i] - x[j])
    t *= y[i]
    result += t

print result
```

10.7227555054

1-2 （拉格朗日插值）利用所给数据计算正弦积分在 x=0.462 的值

In [6]:

```python
x = [0.3, 0.4, 0.5, 0.6, 0.7]
y = [0.29850, 0.39646, 0.49311, 0.58813, 0.61822]

a = 0.462
result = 0.0

for i in range(5):
    t = 1.0
    for j in range(5):
        if j != i:
            t *= (a - x[j]) / (x[i] - x[j])
    t *= y[i]
    result += t

print result
```

0.455175505943

2-1 （牛顿插值）利用 100,121,144 的开方值求 sqrt(115)

In [17]:

```
x = [100.0, 121.0, 144.0]
y = [[10.0, 11.0, 12.0]]

a = 115
result = 0

for i in range(1, 3):
    z = []
    for j in range(3 - i):
        z.append((y[i - 1][j + 1] - y[i - 1][j]) / (x[j + i] - x[j]))
    y.append(z)

c = []
for i in range(3):
    c.append(y[i][0])

for i in range (3):
    t = c[i]
    for j in range(i):
        t *= a - x[j]
    result += t

print result
```

10.7227555054

2-2 （牛顿插值）利用所给数据计算正弦积分在 x=0.462 的值

In [21]:

```
x = [0.3, 0.4, 0.5, 0.6, 0.7]
y = [[0.29850, 0.39646, 0.49311, 0.58813, 0.61822]]

a = 0.462
result = 0.0

for i in range(1, 5):
    z = []
    for j in range(5 - i):
        z.append((y[i - 1][j + 1] - y[i - 1][j]) / (x[j + i] - x[j]))
    y.append(z)

c = []
for i in range(5):
    c.append(y[i][0])

for i in range (5):
    t = c[i]
    for j in range(i):
        t *= a - x[j]
    result += t

print result
```

0.455175505943

3-1 （拉格朗日插值）

In [22]:

```
x = [-2, -1, 0, 1, 2, 3]
y = [-5, 1, 1, 1, 7, 25]

a = 2.25
result = 0

for i in range(6):
    t = 1.0
    for j in range(6):
        if j != i:
            t *= (a - x[j]) / (x[i] - x[j])
    t *= y[i]
    result += t

print result
```

10.140625

3-2 （牛顿插值）

In [20]:

```
x = [-2, -1, 0, 1, 2, 3]
y = [[-5, 1, 1, 1, 7, 25]]

a = 2.25
result = 0

for i in range(1, 6):
    z = []
    for j in range(6 - i):
        z.append((y[i - 1][j + 1] - y[i - 1][j]) / (x[j + i] - x[j]))
    y.append(z)

c = []
for i in range(6):
    c.append(y[i][0])

for i in range(6):
    t = c[i]
    for j in range(i):
        t *= a - x[j]
    result += t

print result
```

10.140625