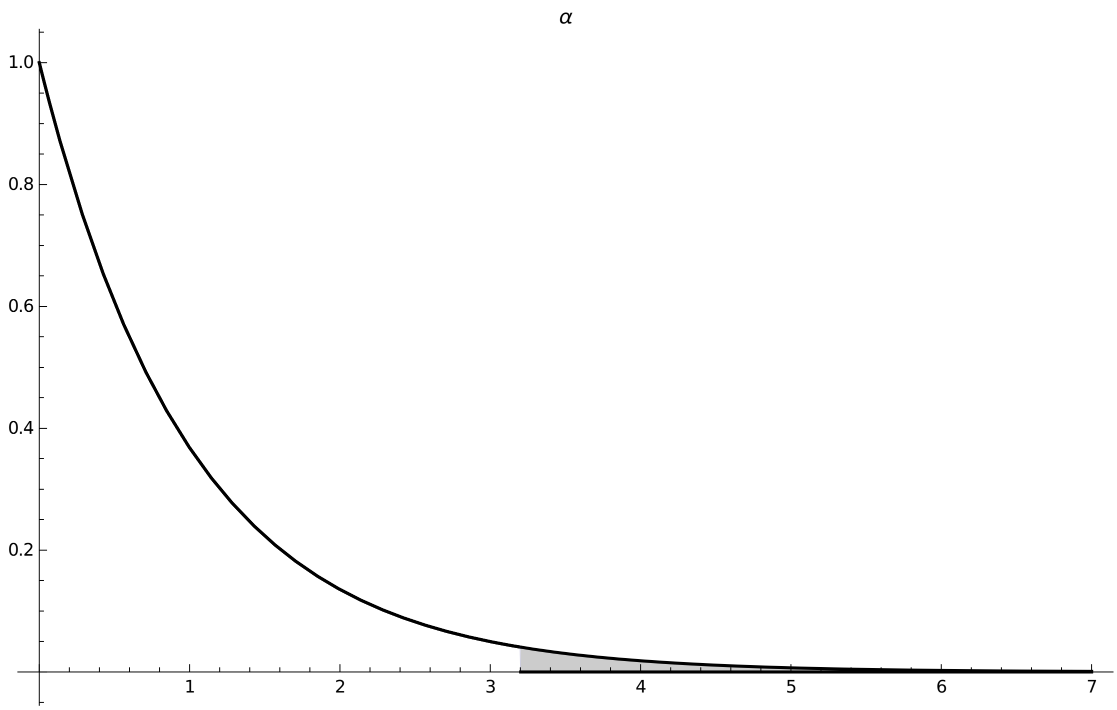
Exercise 2, part (3)

In[8]:=
```
λ0 = 1;
λ1 = 4/3;
yCritical = 3.20;
fY[λ_, y_] := (1/λ) e^(-y/λ)
```

$$\lambda 0 = 1;\quad \lambda 1 = \frac{4}{3};\quad yCritical = 3.20;\quad fY[\lambda\_, y\_] := \frac{1}{\lambda} e^{\frac{-y}{\lambda}}$$

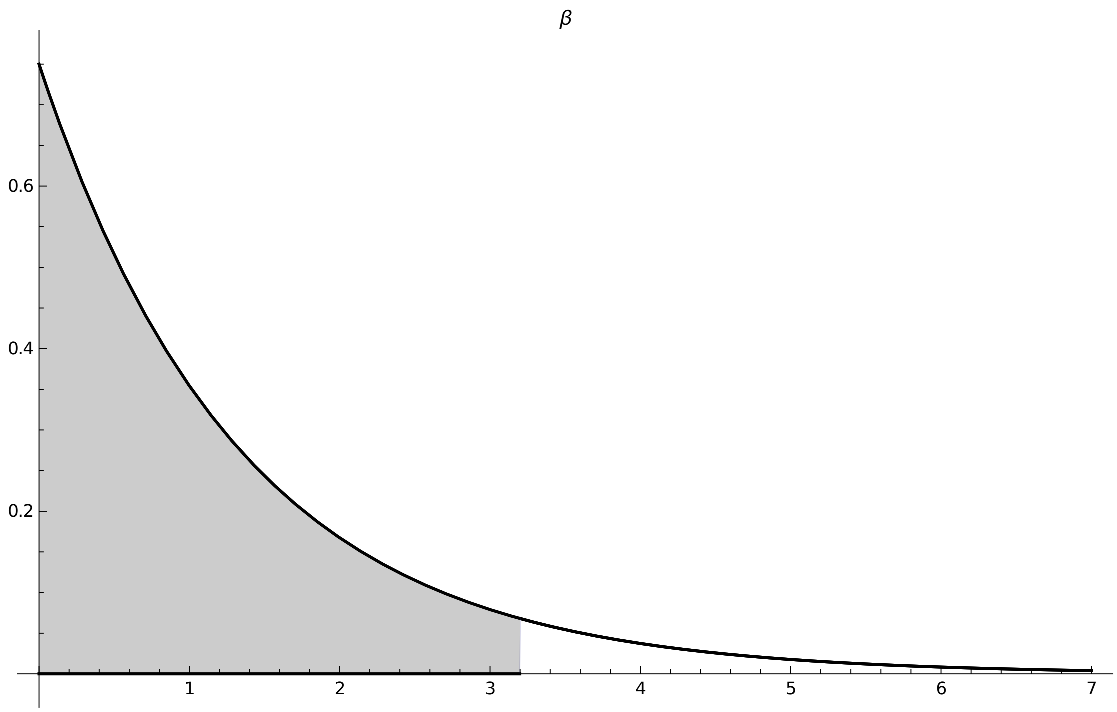
In[44]:=
```
Plot[{If[y ≥ yCritical, 0, fY[λ0, y]], fY[λ0, y]}, {y, 0, 7}, PlotRange → All,
 PlotStyle → {Black}, Filling → {2}, ImageSize → Large, PlotLabel → "α"]
```

Out[44]=



```
In[46]:= Plot[{If[y < yCritical, 0, fY[λ1, y]], fY[λ1, y]}, {y, 0, 7}, PlotRange → All,
          PlotStyle → {Black}, Filling → {2}, ImageSize → Large, PlotLabel → "β"]
```

Out[46]=



In[49]:= $1 - \text{Sum}\left[\frac{e^{-4}\, 4^k}{k!}, \{k, 0, 2\}\right]$ // N

Out[49]= 0.761897

Exercise 4

```
In[56]:= ages = {{1543, 40}, {1600, 34}, {1665, 23}, {1746, 40}, {1774, 31}, {1839, 33},
            {1858, 49}, {1864, 33}, {1896, 34}, {1901, 43}, {1905, 26}, {1926, 39}};

In[61]:= Mean[Transpose[ages][[2]]] // N

Out[61]= 35.4167

In[62]:= Variance[Transpose[ages][[2]]] // N

Out[62]= 52.2652

In[63]:= Sqrt[%]

Out[63]= 7.22946

In[69]:= InverseCDF[StudentTDistribution[11], 0.975]

Out[69]= 2.20099
```

In[70]:=
```
35.4 - 2.20 7.23/Sqrt[12] // N
```

$$35.4 - 2.20\,\frac{7.23}{\text{Sqrt}[12]}\;//\;N$$

Out[70]= 30.8083

In[71]:=

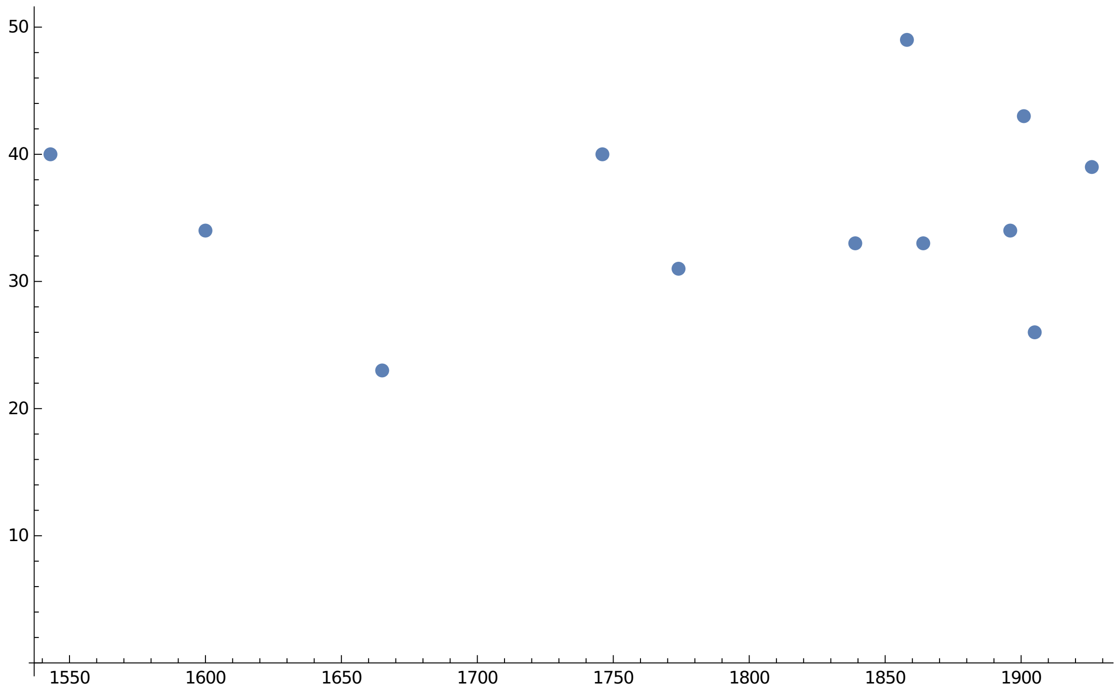
$$35.4 + 2.20\,\frac{7.23}{\text{Sqrt}[12]}\;//\;N$$

Out[71]= 39.9917

Part 2

In[67]:=
```
ListPlot[ages, ImageSize → Large]
```

Out[67]=



This shows no particular distribution seems to be independent of time. Therefore we have no reason to doubt that μ remains constant over time.