In[1]:= (*第一问*)

```
vx0 = v0 Cos[θ0 / 180 * Pi];
         └余弦        └圆周率
vy0 = v0 Sin[θ0 / 180 * Pi];
         └正弦        └圆周率
S = (2 vx0 vy0) / g;
H = vy0^2 / (2 g);
T = (2 vy0) / g;
sol = DSolve[{x''[t] == -b x'[t] / m, y''[t] == -b y'[t] / m - g, x[0] == 0,
      └求解微分方程
     y[0] == 0, x'[0] == vx0, y'[0] == vy0}, {x[t], y[t]}, t]  // ExpandAll;
                                                                 └展开全部

x[t_] = x[t] /. sol[[1, 1]];

tx = Flatten[Simplify[Solve[x[t] == x, t, Reals],
     └压平       └化简       └解方程          └实数域
    b > 0 && v0 > 0 && m > 0 && 0 < θ0 < 90 && x > 0 && m v0 Cos[(π θ0) / 180] > b x]];
                                                            └余弦
yx[x_] = y[t] /. sol[[1, 2]] //. tx
```

$$Out[9]= \frac{g\,m^2}{b^2} - \frac{g\,m^2\,\mathrm{Log}\left[\frac{m\,v0\,\mathrm{Cos}\left[\frac{\pi\,θ0}{180}\right]}{-b\,x+m\,v0\,\mathrm{Cos}\left[\frac{\pi\,θ0}{180}\right]}\right]}{b^2} - \frac{g\,m\,\left(-b\,x+m\,v0\,\mathrm{Cos}\left[\frac{\pi\,θ0}{180}\right]\right)\,\mathrm{Sec}\left[\frac{\pi\,θ0}{180}\right]}{b^2\,v0} +$$
$$\frac{m\,v0\,\mathrm{Sin}\left[\frac{\pi\,θ0}{180}\right]}{b} - \frac{\left(-b\,x+m\,v0\,\mathrm{Cos}\left[\frac{\pi\,θ0}{180}\right]\right)\,\mathrm{Tan}\left[\frac{\pi\,θ0}{180}\right]}{b}$$

In[26]:= `(*第二问*)`

`(*变量定义*)`
```
m = 0.14 ;
v0 = 45;
θ0 = 60;
b = 0.033;
g = 9.81;
vx0 = vx0 // N;
```
数值运算
```
vy0 = vy0 // N;
```
数值运算
```
S = S // N;
```
数值运算
```
H = H // N;
```
数值运算
```
T = T // N;
```
数值运算

```
pathWithoutAirResistance =
    Plot[vy0 / vx0 x - 1 / 2 g / vx0^2 x^2, {x, 0, S}, PlotRange -> {0, H}];
```
绘图   绘制范围

```
yt[t_] = y[t] /. sol[[1, 2]];
tmax = t /. FindRoot[yt[t], {t, T}];
```
求根
```
tab = Table[
```
表格
```
Show[
```
显示
```
pathWithoutAirResistance,
    Graphics[{AbsolutePointSize[7], Red, Point[{x[(tmax / 32) i], yt[(tmax / 32) i]}]}],
```
绝对点大小   红色 点
```
    ParametricPlot[{x[t], yt[t]}, {t, 0, (tmax / 32) i + 0.0001},
```
绘制参数图
```
      PlotStyle -> {Blue, Dashing[{0.02, 0.02}]}], PlotRange ->
```
蓝色 虚线线段配置   绘制范围
```
    {{-0.01, S}, {-0.01, 1.02 H}}, ImageSize -> 500, LabelStyle -> {FontSize -> 20},
```
图像尺寸   标签样式   字体大小
```
    AxesLabel -> {"x(m)", "y(m)", AspectRatio -> Automatic}], {i, 0, 32}];
```
坐标轴标签   宽高比   自动
```
ListAnimate[
```
列表帧动画
```
  tab]
```

Out[40]=