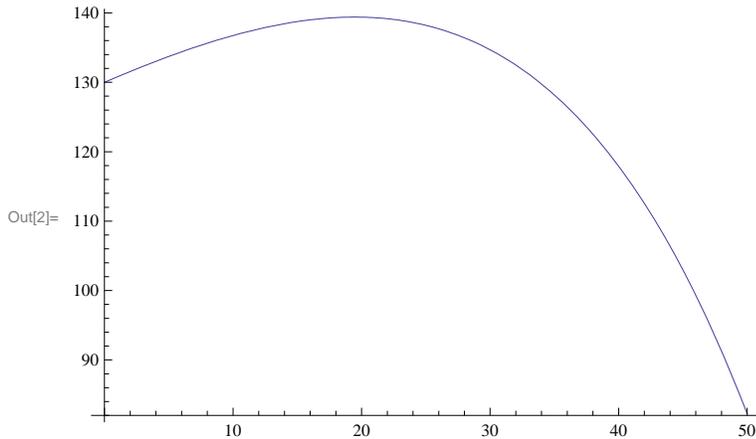


Example 3.1 (p.61) Pig problem

```
In[1]:= y = (0.65 - 0.01 * x) * (200 * Exp[0.025 * x]) - 0.45 * x
```

```
Out[1]= 200 e0.025 x (0.65 - 0.01 x) - 0.45 x
```

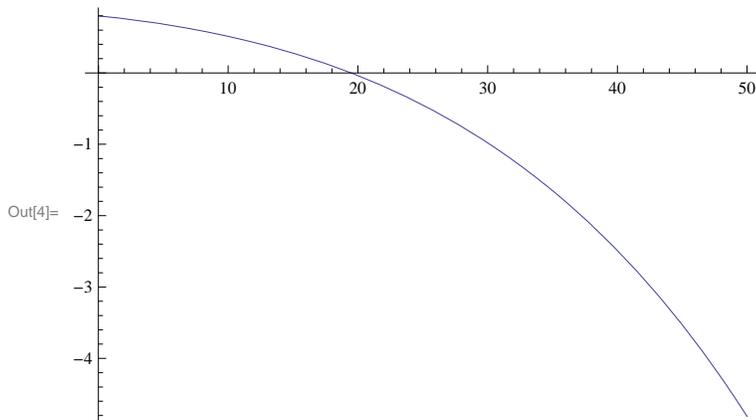
```
In[2]:= Plot[y, {x, 0, 50}]
```



```
In[3]:= dydx = D[y, x]
```

```
Out[3]= -0.45 - 2. e0.025 x + 5. e0.025 x (0.65 - 0.01 x)
```

```
In[4]:= Plot[dydx, {x, 0, 50}]
```



```
In[5]:= s = Solve[dydx == 0, x]
```

Solve::ifun :

Inverse functions are being used by Solve, so some solutions may not be found; use Reduce for complete solution information. >>

```
Out[5]= {{x -> -107.606}, {x -> 19.4682}}
```

```
In[6]:= s = NSolve[dydx == 0, x]
```

NSolve::ifun : Inverse functions are being used by NSolve,

so some solutions may not be found; use Reduce for complete solution information. >>

```
Out[6]= {{x -> -107.606}, {x -> 19.4682}}
```

```
In[7]:= s = FindRoot[dydx == 0, {x, 20}]
```

```
Out[7]= {x -> 19.4682}
```

```
In[8]:= y /. s
```

```
Out[8]= 139.395
```

Newton's Method (see p.68)

```
In[9]:= Clear[x]
```

```
In[10]:= F = dydx
```

```
Out[10]= -0.45 - 2. e0.025 x + 5. e0.025 x (0.65 - 0.01 x)
```

```
In[11]:= F1 = D[F, x]
```

```
Out[11]= -0.1 e0.025 x + 0.125 e0.025 x (0.65 - 0.01 x)
```

```
In[12]:= x = 20; n = 10;
```

```
In[13]:= Do[x = x - F / F1; Print[x], {n}]
```

```
19.4757
```

```
19.4682
```

```
19.4682
```

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19.4682
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19.4682
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19.4682
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19.4682
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19.4682
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```
19.4682
```

```
19.4682
```