

Section 15.5 Applications of Double Integrals

Example (i)

In[1]:= **m = Integrate[Integrate[x * y, {x, y, 2 - y}], {y, 0, 1}]**

Out[1]= $\frac{1}{3}$

In[2]:= **Mx = Integrate[Integrate[x * y^2, {x, y, 2 - y}], {y, 0, 1}]**

Out[2]= $\frac{1}{6}$

In[3]:= **My = Integrate[Integrate[x^2 * y, {x, y, 2 - y}], {y, 0, 1}]**

Out[3]= $\frac{11}{30}$

In[4]:= **xbar = My / m**
ybar = Mx / m

Out[4]= $\frac{11}{10}$

Out[5]= $\frac{1}{2}$

Example (ii)

In[6]:= **Clear[m, Mx, My]**

In[7]:= **m = $\int_{\pi/6}^{5\pi/6} \int_1^{2\sin[t]} r \, dr \, dt$**

Out[7]= $\frac{1}{6} (3\sqrt{3} + 2\pi)$

In[8]:= **Mx = $\int_{\pi/6}^{5\pi/6} \int_1^{2\sin[t]} r^2 \sin[t] \, dr \, dt$**

Out[8]= $\frac{\sqrt{3}}{4} + \frac{2\pi}{3}$

In[9]:= **My = $\int_{\pi/6}^{5\pi/6} \int_1^{2\sin[t]} r^2 \cos[t] \, dr \, dt$**

Out[9]= 0

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In[10]:= xbar = My / m  
ybar = Mx / m
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Out[10]= 0
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Out[11]= 
$$\frac{6 \left( \frac{\sqrt{3}}{4} + \frac{2\pi}{3} \right)}{3\sqrt{3} + 2\pi}$$

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In[12]:= N[ybar]
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Out[12]= 1.32102
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