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In[60]:= (* We compute the surface area of triangle ABC *)
a = {0, 0, 0}
b = {2, 0, 0}
c = {0, 3, 5}

Out[60]= {0, 0, 0}

Out[61]= {2, 0, 0}

Out[62]= {0, 3, 5}

In[63]:= (* parametrization *)
r = v (u a + (1 - u) b) + (1 - v) c
Out[63]= {2 (1 - u) v, 3 (1 - v), 5 (1 - v)}

In[64]:= (* normal vector *)
ru = D[r, u]
rv = D[r, v]
n = Simplify[Cross[ru, rv]]
nn = Simplify[Norm[n], Assumptions -> 0 < u < 1 && 0 < v < 1]

Out[64]= {-2 v, 0, 0}

Out[65]= {2 (1 - u), -3, -5}

Out[66]= {0, -10 v, 6 v}

Out[67]=  $2 \sqrt{34} v$ 

In[68]:= (* surface area *)
Integrate[Integrate[nn, {u, 0, 1}], {v, 0, 1}]
Out[68]=  $\sqrt{34}$ 

In[75]:= (* Alternate parametrization *)
r = u a + v b + (1 - u - v) c
ru = D[r, u]
rv = D[r, v]
n = Simplify[Cross[ru, rv]]
nn = Simplify[Norm[n], Assumptions -> 0 < u < 1 && 0 < v < 1]
Integrate[Integrate[nn, {u, 0, 1 - v}], {v, 0, 1}]

Out[75]= {2 v, 3 (1 - u - v), 5 (1 - u - v)}

Out[76]= {0, -3, -5}

Out[77]= {2, -3, -5}

Out[78]= {0, -10, 6}

Out[79]=  $2 \sqrt{34}$ 

Out[80]=  $\sqrt{34}$ 

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