

# SOLUTION KEY

**Section: 34**

Name & Surname: \_\_\_\_\_

Math 120 Spring 2017-2018

Quiz no.: 05

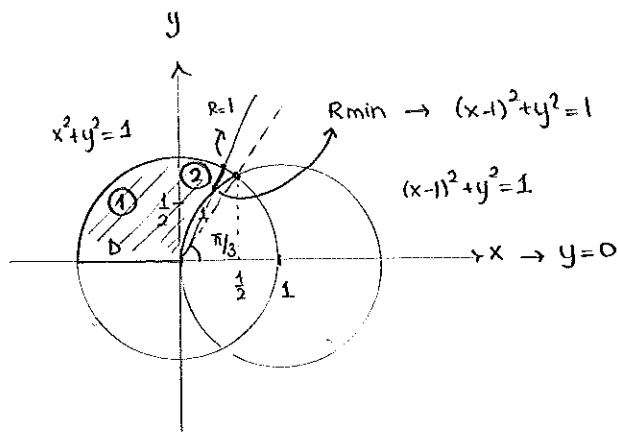
ID Number: \_\_\_\_\_

Date: 03.05.18

Time Limit: ~15 Minutes

Grade: \_\_\_\_\_

1. Express the double integral  $\iint_D f(x,y) dA$  in polar iterated integrals where  $D$  is the region bounded by  $y = 0$ ,  $(x-1)^2 + y^2 = 1$  and  $x^2 + y^2 = 1$  containing the point  $(0, 1/2)$ .



①

$$\left. \begin{aligned} x^2 + y^2 &= 1 \\ x^2 - 2x + 1 + y^2 &= 1 \end{aligned} \right\} x = \frac{1}{2}$$

Part ②:  
On the interval  $\theta \in \left[ \frac{\pi}{3}, \frac{\pi}{2} \right]$

$$\begin{aligned} R &\sim (x-1)^2 + y^2 = 1 \\ x^2 - 2x + 1 + y^2 &= 1 \\ R^2 - 2R \cos \theta &= 0 \\ R^2 &= 2R \cos \theta \Rightarrow R = 2 \cos \theta \end{aligned}$$

②

$$\iint_D f(x,y) dA = \int_{\frac{\pi}{2}}^{\pi} \int_0^1 f(R,\theta) R dR d\theta + \int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \int_{2 \cos \theta}^1 f(R,\theta) R dR d\theta$$