Section:

Name & Surname: SAMPLE -1-

Math 119 Fall 2019-2020
Quiz no.: 06
Date: 26.12.19
Time Limit: ~10 Minutes

ID Number:

Grade:

Volume using Syllindrical Shell Method

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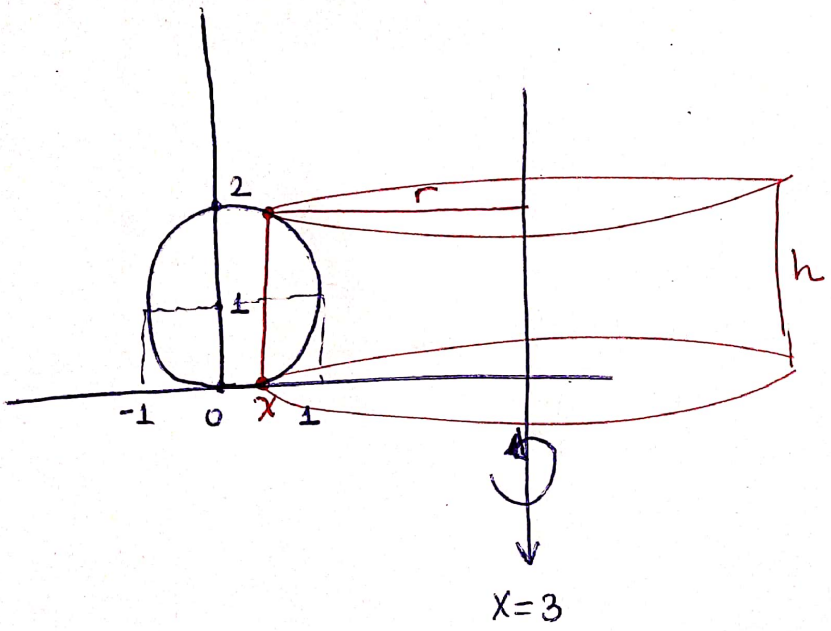
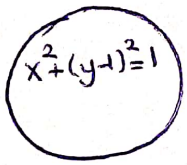
1. Express **(do not evaluate)** the volume of the solid obtained by rotating the region bounded by

$$x^2 + (y-1)^2 = 1$$

about the line $x = 3$.



Note:



$y = 1+\sqrt{1-x^2}$ (upper half of circle)

$y = 1-\sqrt{1-x^2}$ (bottom half of circle)

$r = 3-x$ and $h = 1+\sqrt{1-x^2} - (1-\sqrt{1-x^2})$

$h = 2\sqrt{1-x^2}$

$\Rightarrow dV = 2\pi r h \cdot dx$

$= 2\pi \cdot (3-x) \cdot 2 \cdot \sqrt{1-x^2} \cdot dx$

$$V = \int_{-1}^{1} dV = \int_{-1}^{1} 4\pi \cdot (3-x)\sqrt{1-x^2}\, dx$$

(see page 2)

continue ↓↓

Section:

Math 119 Fall 2019-2020
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Name & Surname: Sample Key - 2 -

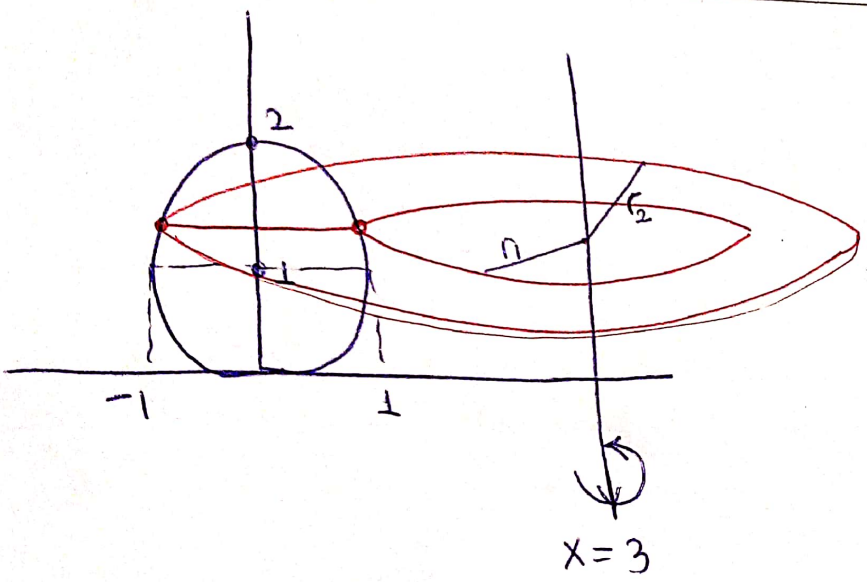
ID Number: Volume

Grade: using disc Method

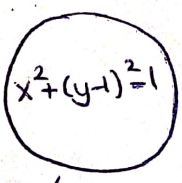
1. Express (**do not evaluate**) the volume of the solid obtained by rotating the region bounded by

$$x^2 + (y-1)^2 = 1$$

about the line $x = 3$.



Note!



$x = -\sqrt{1-(y-1)^2}$ (left half circle)

$x = \sqrt{1-(y-1)^2}$ (right half circle)

$$r_1 = 3 - \sqrt{1-(y-1)^2}$$

$$r_2 = 3 - \left(-\sqrt{1-(y-1)^2}\right)$$

$$dV = \pi \cdot (r_2^2 - r_1^2) \cdot dy$$

$$= \pi \cdot \left[\left(3+\sqrt{1-(y-1)^2}\right)^2 - \left(3-\sqrt{1-(y-1)^2}\right)^2 \right] dy$$

$$V = \int_0^2 dV = \int_0^2 \pi \cdot \left[\left(3+\sqrt{1-(y-1)^2}\right)^2 - \left(3-\sqrt{1-(y-1)^2}\right)^2 \right] dy$$