**King Saud University**

**College of Sciences**

**Department of Mathematics**

**Math 111**

**Final exam**

**Second semester, 1430-1431H**

**Time 3 Hours**

|  |  |  |  |  |  |  |  |  |  |  |
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| **Name:** | | | | | **Student No.:** | | | | | |
| **Section No.:** | | | | | **Sequence No.:** | | | | | |
|  | | | | | | | | | | |
| **Question No.** | **I** | | **II** | **III** | | **IV** |  | | **BONUS** | **Total** |
| **Mark** |  | |  |  | |  |  | |  |  |
| **QUESTION I**  **Choose the correct answer** | | | | | | | | | | |
| 1. The value of x that satisfies the equation  is equal to: | | | | | | | | | | |
| i. | | Ii. 1 | | | iii. | | | iv. None of the previous. | | |
|  | | | | | | | | | | |
| 2. Given that , then  is equal to: | | | | | | | | | | |
| i. 1 | | ii. 2 | | | iii. . | | | iv. None of the previous. | | |
|  | | | | | | | | | | |
| 3.  is equal to: | | | | | | | | | | |
| i. . | | ii. . | | | iii.. | | | iv. None of the previous. | | |
|  | | | | | | | | | | |
| 4. The integral  is equal to; | | | | | | | | | | |
| i. 1. | | ii. | | | iii. | | | iv. None of the previous. | | |
|  | | | | | | | | | | |
| 5. The partial fraction of  is equal to: | | | | | | | | | | |
| i. . | | ii. . | | | iii.. | | | iv. None of the previous. | | |
|  | | | | | | | | | | |
| 6. If  then is equal to: | | | | | | | | | | |
| i. . | | ii. . | | | iii. . | | | iv. None of the previous. | | |
|  | | | | | | | | | | |
| 7. A parametric equation of a line segment joining the points and is | | | | | | | | | | |
| i. . | | ii. | | | iii. | | | iv. None of the previous. | | |
|  | | | | | | | | | | |
| 8. The rectangular equation corresponding to the polar equation  is: | | | | | | | | | | |
| i. . | | ii. . | | | iii. . | | | iv. None of the previous. | | |
|  | | | | | | | | | | |
| 9. A polar coordinate representation of the rectangular point  is: | | | | | | | | | | |
| i. . | | ii. | | | iii. | | | iv. None of the previous. | | |
|  | | | | | | | | | | |
| 10. The rectangular equation corresponding to the polar equation  is | | | | | | | | | | |
| i. | | ii. | | | iii. | | | iv. None of the previous. | | |
| **QUESTION II** | | | | | | | | | | |
| 1.a. Draw the following functions then shade in the area bounded by them **(DO NOT INTEGRATE)**: | | | | | | | | | | |
|  | | | | | | | | | | |
| 1.b. Calculate the area between the functions in part (a). | | | | | | | | | | |
|  | | | | | | | | | | |
| 2. Find the volume of the solid formed by revolving the region bounded by the equations    1) about the **x-axis**  2) about the **y-axis** | | | | | | | | | | |
| **QUESTION III** | | | | | | | | | | |
| 1. Find a polar equation corresponding to the rectangular equation  . | | | | | | | | | | |
|  | | | | | | | | | | |
| 2. Sketch the graph of the polar equation. | | | | | | | | | | |
|  | | | | | | | | | | |
| 3. Find the area of the region of from  to . | | | | | | | | | | |
| **Question IV**  **Evaluate the following integrals if it exists** | | | | | | | | | | |
| 1. . | | | | | | | | | | |
|  | | | | | | | | | | |
| 2. . | | | | | | | | | | |
|  | | | | | | | | | | |
| 3. . | | | | | | | | | | |
|  | | | | | | | | | | |
| 4. . | | | | | | | | | | |
|  | | | | | | | | | | |
| 5. Find the arc length of  from  to . | | | | | | | | | | |
| **BONUS QUESTION** | | | | | | | | | | |
| Determine whether the following integral converges or diverges. Find the value of the integral if it converges  . | | | | | | | | | | |

Good Luck