

Fayoum University
Faculty of Engineering

Preparatory Year
Mathematics
Prof. Dr. Samy El Badawy Yehia

Time : 90 Minutes.
May, 4, 2010.
Second term Midterm Test.

رقم الجلوس :

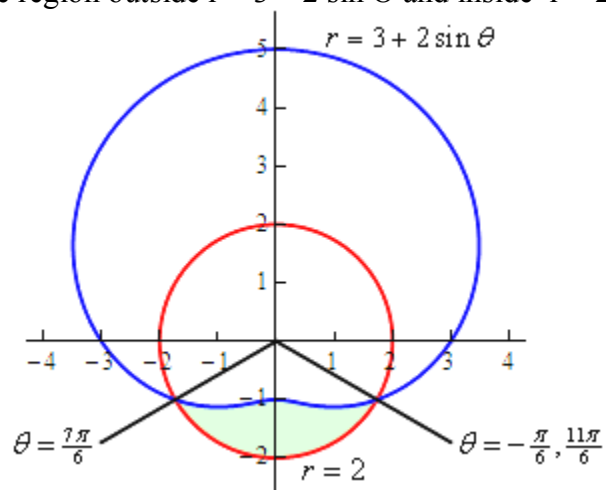
الفصل :

الإسم :

1) $\int \frac{4x+5}{x^2+2x+2} dx =$

2) $\int \frac{\sqrt{x^3+1}}{x} dx =$

3) Determine the area of the region outside $r = 3 + 2 \sin \theta$ and inside $r = 2$ (shaded area).



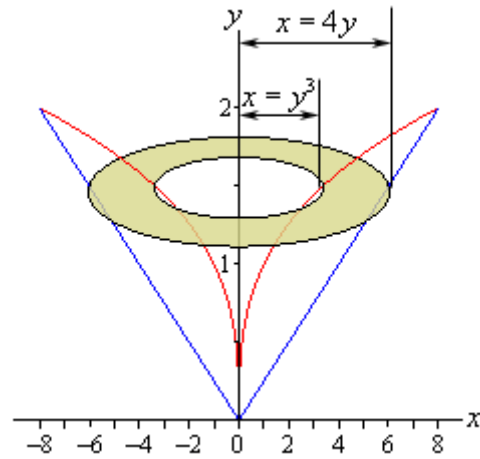
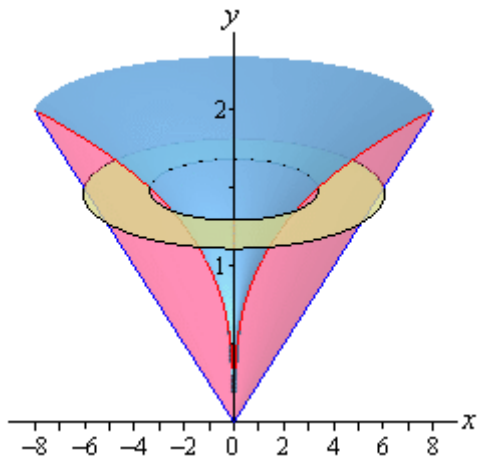
4) Show that the angle between the pair of lines :

$$3x^2 - 7xy + 4y^2 = 0$$

is equal to the angle between the pair

$$6x^2 - 5xy + y^2 = 0$$

5) The area bounded between the curves $y = \sqrt[3]{x}$ and $y = \frac{x}{4}$ is revolved about the y axis. Find the volume of the resulting solid.



6) The space ship Apollo 11 orbited the moon before landing on it. The orbit was an elliptical shape with the centre of the moon as one of its focii. If the radius of the moon is 1728 km. The nearest point of the orbit to the surface of the moon was 110 km. The farthest point was 314 km. Find the equation of this ellipse.

7) Given the two circles :

$$S_1 : x^2 + y^2 + 2g_1x + 2f_1y + c_1 = 0 ,$$

$$S_2 : x^2 + y^2 + 2g_2x + 2f_2y + c_2 = 0$$

Show that for each $\lambda \in \mathbb{R}$ (\mathbb{R} is the set of real numbers) , the circle $S_1 + \lambda S_2 = 0$ is coaxial with both S_1 and S_2 .