

8. [12 points] Circle **all** that apply. You do not need to provide an explanation for your answer.

a. [3 points] Which of the following are parameterizations for the circle of radius 2 centered at the origin for  $0 \leq t \leq \pi$ ?

$x = \cos(2t), \quad y = \sin(2t)$

$x = \sqrt{2} \cos(t), \quad y = \sqrt{2} \sin(t)$

$x = 2 \cos(2t), \quad y = -2 \sin(2t)$

b. [3 points] Which of the following are antiderivatives of  $e^{-x^4}$ ?

$\int_1^{x^4} e^{-t} dt$

$\int_1^x e^{-t^4} dt$

$-\frac{1}{2} \int_{2x}^1 e^{-t^4/16} dt$

c. [3 points] Suppose that  $F(x)$  is an odd function which is concave down and increasing for  $x \geq 0$ . Which of the following approximations is certain to give an overestimate for  $\int_{-2}^1 F(x) dx$ ?

LEFT(4)

RIGHT(4)

TRAP(3)

d. [3 points] The integral  $\int_0^1 4\pi z^2(1 - z^2) dz$  gives the volume of which of the following solids of revolution?

The region bounded by  $y = 2x\sqrt{1 - x^2}$  and  $y = 0$  rotated about the  $x$ -axis.

The region bounded by  $y = 0$ ,  $x = 1$  and  $y = 2x^2(1 + x)$  rotated about line  $x = 1$ .

The region bounded by  $x = 2y$  and  $x = 2y^2$  rotated about the  $y$ -axis.