

MAT 126 Fall 2020, Quiz 7

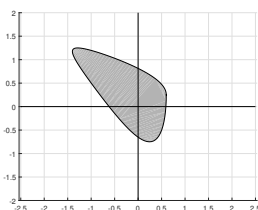
Name	ID	Section
------	----	---------

**THIS QUIZ IS WORTH 10 POINTS.  
NO BOOKS, NOTES OR CALCULATORS ARE ALLOWED.**

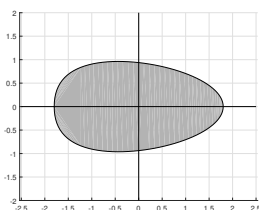
Write the correct answer in the box.

Find the figure with the given location of its center of mass

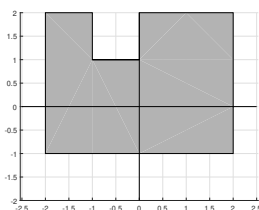
- (1)  1st quadrant ( $x, y > 0$ )      (2)  negative  $x$ -axis ( $x < 0, y = 0$ )



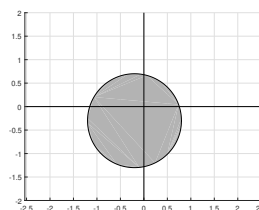
A



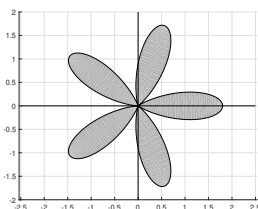
B



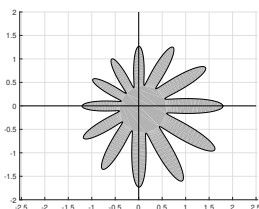
C



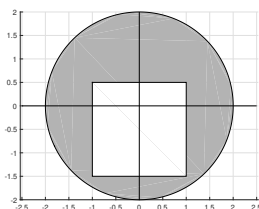
D



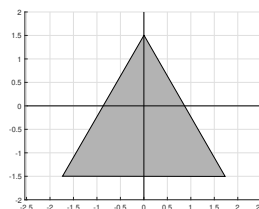
E



F



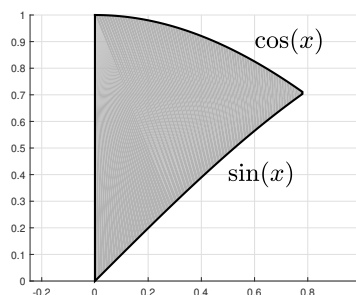
G



H

- (3)  Find the mass of the region on the right (density  $\rho = 1$ ).

- (a) 1                      (e)  $\sqrt{2}/2$   
 (b)  $1/2$                 (f)  $\sqrt{2} - 1$   
 (c)  $1/4$                 (g)  $2\sqrt{2}$   
 (d)  $\sqrt{2}$                 (h) none of these



- (4)  Find the  $x$ -moment of this region from (a)-(j) below.      (5)  Find the  $y$ -moment of this region from (a)-(j) below.

- (a)  $\frac{1}{2} \int_0^{\pi/4} x(\cos x - \sin x)$       (d)  $\int_0^{\pi/4} x(\cos x - \sin x)$       (g)  $\frac{1}{2} \int_0^{\pi/4} (\cos^2 x - \sin^2 x)$   
 (b)  $\frac{1}{2} \int_0^{\pi/4} x(\cos^2 x - \sin^2 x)$       (e)  $\int_0^{\pi/4} (\cos x - \sin x)$       (h)  $\int_0^{\pi/2} (\cos x - \sin x)$   
 (c)  $\int_0^{\pi/4} (\cos x - \sin x)$       (f)  $\int_0^{\pi/4} x(\cos x + \sin x)$       (i)  $\int_0^{\pi/4} x(\sin x - \cos x)$   
 (j) none of these

- (6)  Let  $S = \{(x, y) : 4 \leq x \leq 5, 0 \leq y \leq 2\}$ . Use the theorem of Pappus to compute the volume obtained by rotating  $S$  around the  $y$ -axis.

(a)  $\pi$                       (d)  $9\pi$                       (g)  $18\pi$                       (j) none of these  
 (b)  $2\pi$                       (e)  $12\pi$                       (h)  $20\pi$   
 (c)  $4\pi$                       (f)  $16\pi$                       (i)  $24\pi$

- (7)  Compute the derivative of  $x^x$ .

(a)  $x^x$                       (d)  $x^x \ln x$                       (g)  $x^x \ln(x^x)\pi$                       (j) none of these  
 (b)  $x^{x-1}$                       (e)  $x^x e^x$                       (h)  $e^{x \ln x}$   
 (c)  $x^{x-1} \ln x$                       (f)  $(1 + \ln x)x^x$                       (i)  $e^x \ln x$

- (8)  Find the minimum value of  $x^x$  on  $[0, 1]$ .

(a) 0                      (d)  $e$                       (g)  $e^{-e}$                       (j) none of these  
 (b)  $1/2$                       (e)  $1/e$                       (h)  $e^{-1/e}$   
 (c) 1                      (f)  $\sqrt{e}$                       (i)  $e^e$

- (9)  A turkey is removed from a  $350^\circ$  degree oven and placed in a  $75^\circ$  degree room. Newton's Law of Cooling says the temperature  $T$  after  $t$  hours is given by

(a)  $T = 350e^{-kt} + 75$                       (d)  $T = 275e^{-t}$                       (g)  $T = 450 - 75e^{-kt}$   
 (b)  $T = 350e^{-t}$                       (e)  $T = 275e^{-kt}$                       (h)  $T = 75 + 350e^{-kt}$   
 (c)  $T = 275e^{-kt} + 75$                       (f)  $T = 225e^{-kt} + 350$                       (i) none of these

- (10)  If the turkey in the previous problem is at  $300^\circ$  degrees after one hour, what is the value of  $k > 0$ ?

(a)  $k = 350$                       (d)  $k = \ln(350)$                       (g)  $k = \ln\left(\frac{275}{225}\right)$                       (j) none of these  
 (b)  $k = 75$                       (e)  $k = \ln(75)$                       (h)  $k = \ln\left(\frac{350}{75}\right)$   
 (c)  $k = 275$                       (f)  $k = \ln(275)$                       (i)  $k = \ln\left(\frac{350}{275}\right)$

Answers: 1C, 2B, 3f, 4g, 5d, 6g, 7f, 8h, 9c, 10g