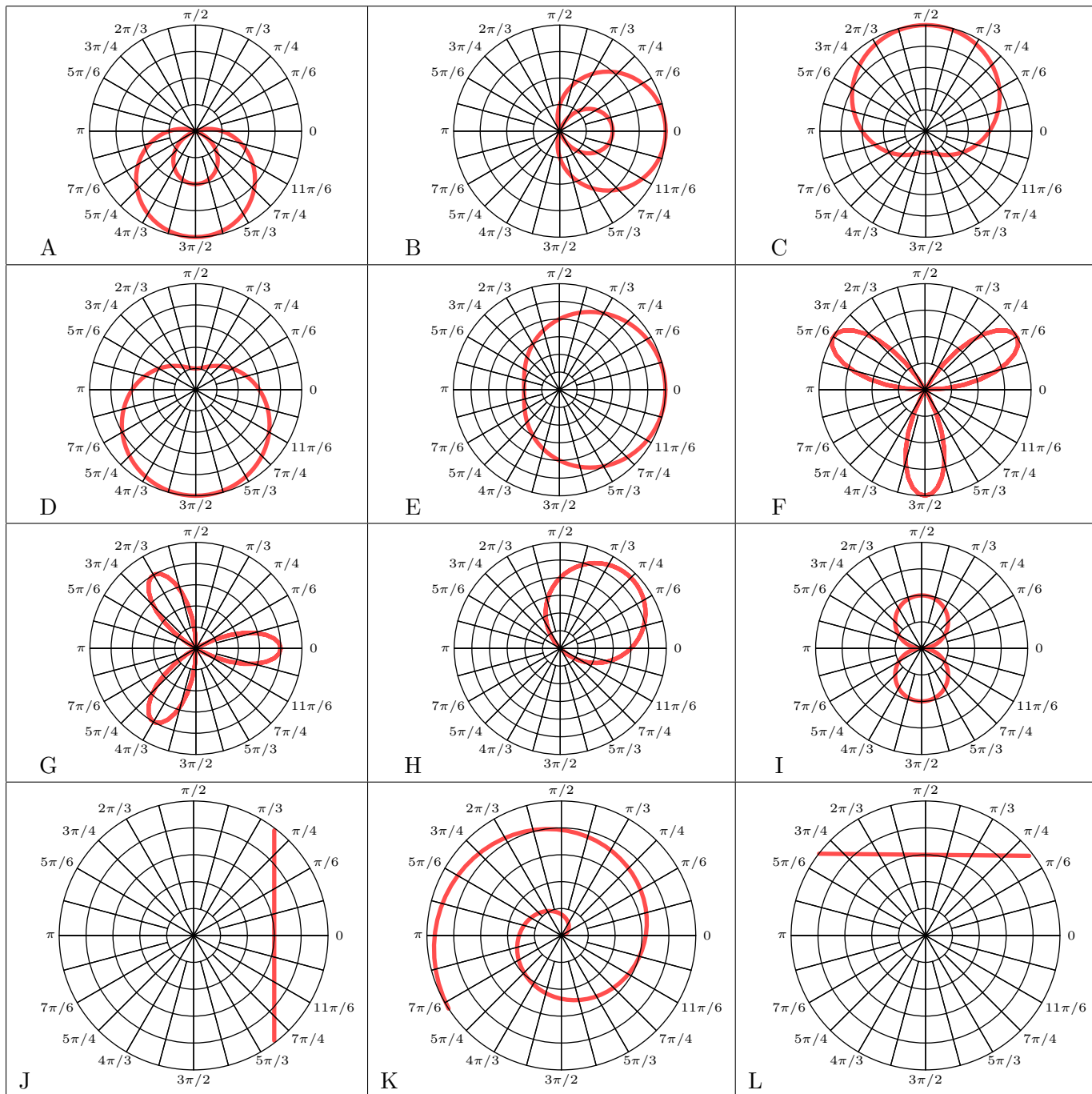


Matching – 1 point each question



1. $r = 4 \cos(3\theta)$ **G**

2. $r = 4 + 2 \cos(\theta)$ **E**

3. $r = 3 \csc(\theta)$ **L**

4. $r = 4 \sin(3\theta)$ **F**

5. $r = \theta/2$ **K**

6. $r = 4 \sin(\theta) + 4 \cos(\theta)$ **H**

7. $r = 1 - 3 \sin(\theta)$ **A**

8. $r^2 = 4 \sin^2(\theta)$ **I**

9. $r = 3 + 2 \sin(\theta)$ **C**

10. $r = 3 - 2 \sin(\theta)$ **D**

11. $r = 1 + 3 \cos(\theta)$ **B**

12. $r = 3 \sec(\theta)$ **J**

Short Answer – 2 pts each

Work must be shown for credit.

1. Convert the polar coordinate to rectangular coordinates: $(-2, 2\pi/3)$

2. Convert the polar coordinate to rectangular coordinates: $(4, -\pi/2)$

3. Convert the rectangular coordinate to polar coordinates: $(15, 5\sqrt{3})$

4. Convert the rectangular coordinate to polar coordinates: $(-12, -12)$

$$(1, -\sqrt{3})$$

1. _____

$$(0, -4)$$

2. _____

$$(10\sqrt{3}, \frac{\pi}{6})$$

3. _____

$$(12\sqrt{2}, -\frac{3\pi}{4})$$

4. _____

5. Convert the rectangular equation to polar: $x^2 + y^2 = 16$

$$r = 4$$

5. _____

6. Convert the rectangular equation to polar: $2xy = 1$

$$r^2 = \frac{1}{2 \sin \theta \cos \theta}$$

6. _____

7. Convert the polar equation to rectangular: $\theta = 2\pi/3$

$$y = -\sqrt{3}x$$

7. _____

8. Convert the polar equation to rectangular: $r = \frac{2}{1 + \sin \theta}$

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

8. _____

9. Find the intersection points of $r = 3 \cos \theta$ and $r = \sqrt{3} \sin \theta$

9. $\{\pi/3, 4\pi/3\}$ _____

Free Response Section

Calculator Active

At time t , a particle moving in the xy -plane is at position $(x(t), y(t))$, where $x(t)$ and $y(t)$ are not explicitly given. For $t \geq 0$, $\frac{dx}{dt} = 4t + 1$ and $\frac{dy}{dt} = \sin(t^2)$. At time $t = 0$, $x(0) = 0$ and $y(0) = -4$.

1. Find the speed of the particle at time $t = 3$.
2. Find the acceleration vector of the particle at time $t = 3$.
3. Find the slope of the line tangent to the path of the particle at time $t = 3$.
4. Find the position of the particle at time $t = 3$.
5. Find the total distance traveled by the particle over the time interval $0 \leq t \leq 3$.