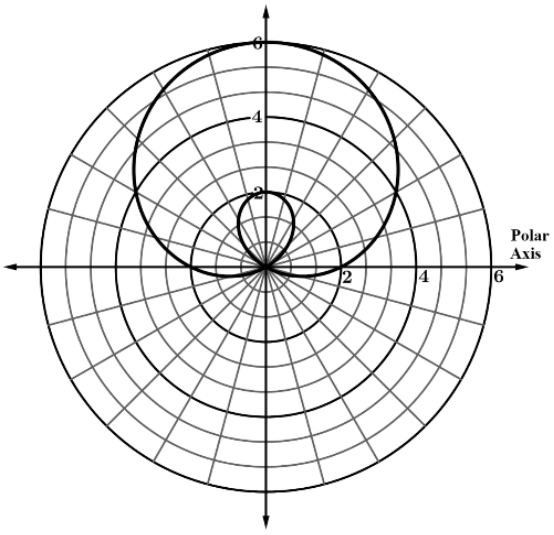
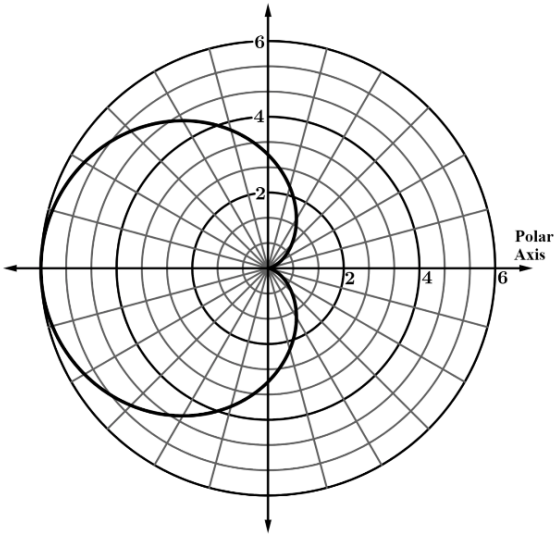


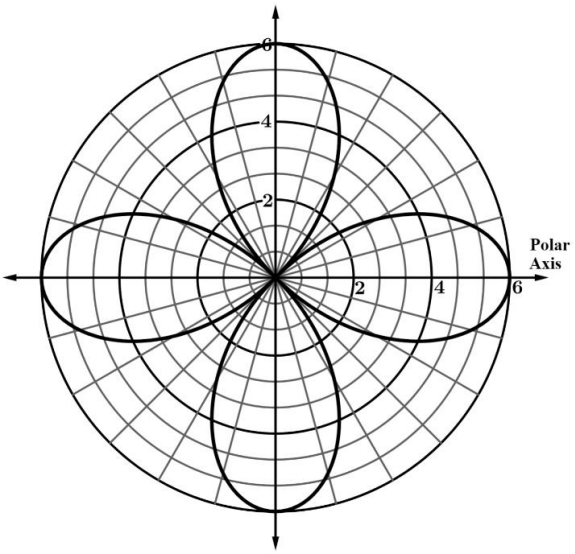
1. The figure shows the graph of the polar function $r = f(\theta)$, for $0 \le \theta \le 2\pi$, in the polar coordinate system. Which of the following could be an expression for $f(\theta)$?

(A) $2 + 4\sin\theta$ (B) $2 - 4\sin\theta$ (C) $2 + 4\cos\theta$ (D) $2 - 4\cos\theta$



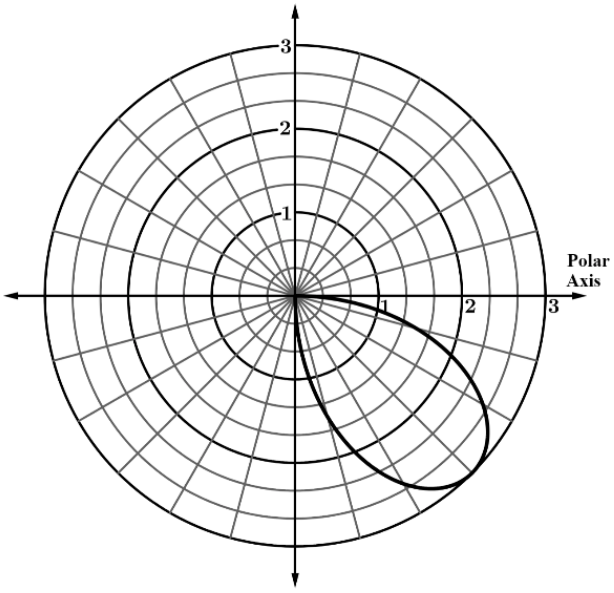
2. The figure shows the graph of the polar function $r = f(\theta)$, for $0 \le \theta \le 2\pi$, in the polar coordinate system. Which of the following could be an expression for $f(\theta)$?

(A) $3 + 3\sin\theta$ (B) $3 - 3\sin\theta$ (C) $3 + 3\cos\theta$ (D) $3 - 3\cos\theta$



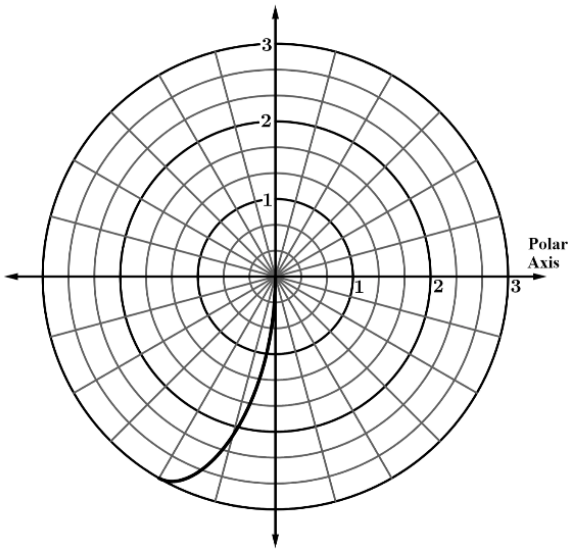
3. The figure shows the graph of the polar function $r = f(\theta)$, for $0 \le \theta \le 2\pi$, in the polar coordinate system. Which of the following could be an expression for $f(\theta)$?

(A) $6\cos(2\theta)$ (B) $6\cos(4\theta)$ (C) $6\sin(2\theta)$ (D) $6\sin(4\theta)$



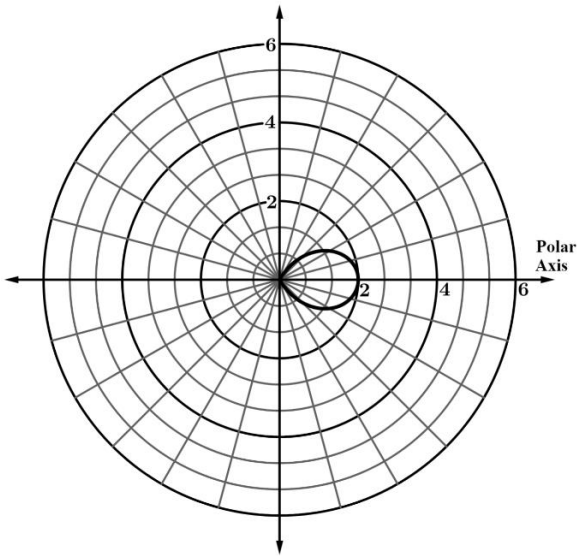
4. A portion of the grpah of the polar function $r = f(\theta)$, where $f(\theta) = 3\sin(2\theta)$, is shown in the polar coordinate system for $a \le \theta \le b$. If $0 \le a < b < 2\pi$, which of the following could be the values for a and b?

(A) $a = \frac{\pi}{4}$ and $b = \frac{\pi}{2}$ (B) $a = \frac{\pi}{2}$ and $b = \pi$ (C) $a = \frac{3\pi}{4}$ and $b = \pi$ (D) $a = \frac{3\pi}{2}$ and $b = 2\pi$



5. A portion of the grpah of the polar function $r = f(\theta)$, where $f(\theta) = 3\cos(3\theta)$, is shown in the polar coordinate system for $a \le \theta \le b$. If $0 \le a < b < 2\pi$, which of the following could be the values for a and b?

(A) $a = 0$ and $b = \frac{\pi}{6}$ (B) $a = \frac{\pi}{6}$ and $b = \frac{\pi}{3}$ (C) $a = \frac{\pi}{3}$ and $b = \frac{\pi}{2}$ (D) $a = \frac{5\pi}{4}$ and $b = \frac{3\pi}{2}$



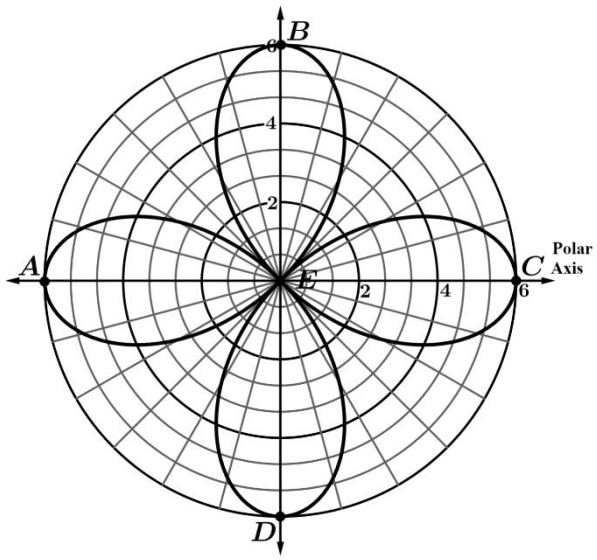
6. A portion of the grpah of the polar function $r = f(\theta)$, where $f(\theta) = 2 + 4\cos\theta$, is shown in the polar coordinate system for $a \le \theta \le b$. If $-2\pi \le a < b < 2\pi$, which of the following could be the values for a and b?

(A) $a = -\frac{2\pi}{3}$ and $b = \frac{2\pi}{3}$

(B) $a = -\frac{\pi}{3}$ and $b = \frac{\pi}{3}$

(C) $a = \frac{\pi}{2}$ and $b = \frac{3\pi}{2}$

(D) $a = \frac{2\pi}{3}$ and $b = \frac{4\pi}{3}$



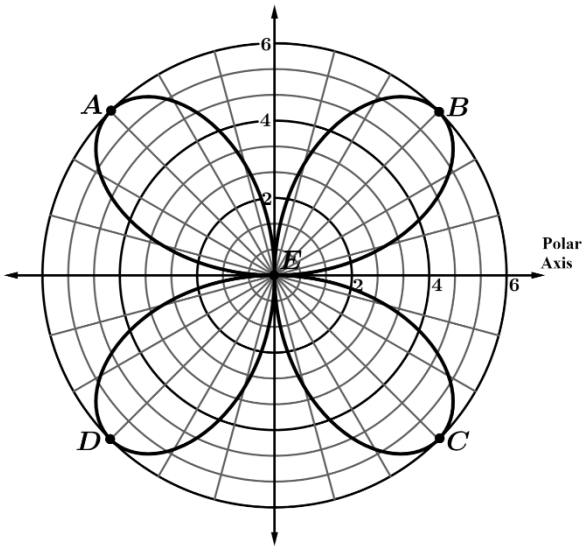
7. The figure shows the graph of the polar function $r = f(\theta)$, where $f(\theta) = 6\cos(2\theta)$, in the polar coordinate system for $0 \le \theta \le 2\pi$. There are four points labeled A, B, C, D and E. If the domain of f is restricted to $\frac{\pi}{2} \le \theta \le \pi$, the portion of the given graph that remains consists of two pieces. One of those pieces is the portion of the graph in Quadrant IV from D to E. Which of the following describes the other remaining piece?

(A) The portion of the graph in Quadrant II from B to E

(B) The portion of the graph in Quadrant II from E to A

(C) The portion of the graph in Quadrant III from E to D

(D) The portion of the graph in Quadrant IV from E to C



8. The figure shows the graph of the polar function $r = f(\theta)$, where $f(\theta) = 6\sin(2\theta)$, in the polar coordinate system for $0 \le \theta \le 2\pi$. There are four points labeled A, B, C, D and E. If the domain of f is restricted to $\frac{\pi}{2} \le \theta \le \frac{3\pi}{4}$, which of the following describes the portion of the given graph that remains?

(A) The top portion of the graph in Quadrant II from E to A

(B) The bottom portion of the graph in Quadrant II from A to E

(C) The top portion of the graph in Quadrant IV from C to E

(D) The bottom portion of the graph in Quadrant IV from E to C