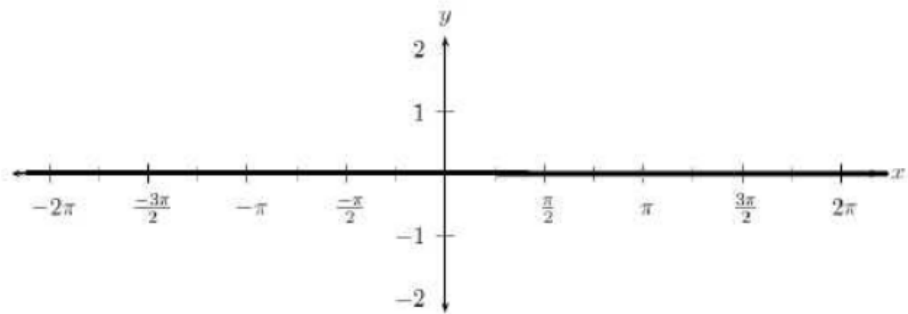
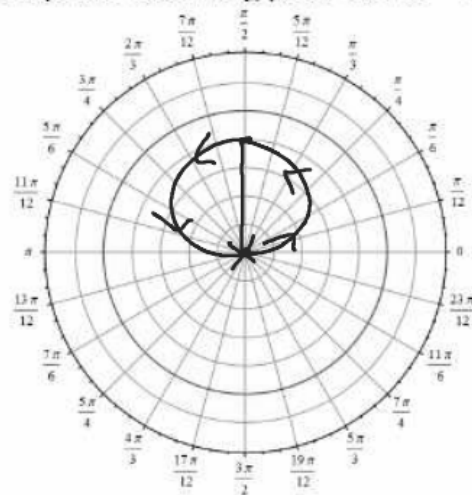


A) Graph the following: $y = 4\sin x$

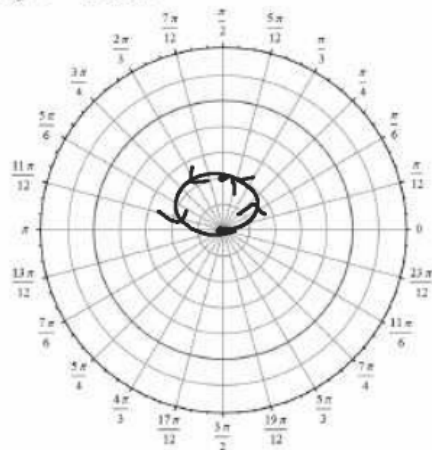


Graph the following polar curve: $r = 4\sin\theta$

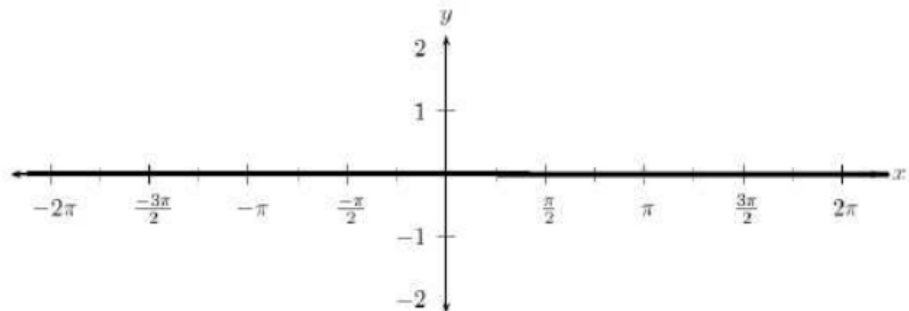


$4\sin(\theta)$
 $4\sin \frac{\pi}{2}$
 $4(1)$

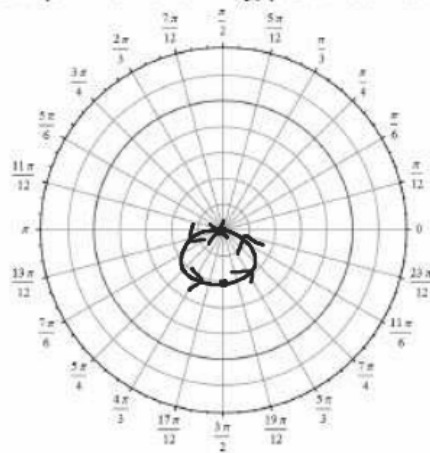
B) $r = 2\sin\theta$



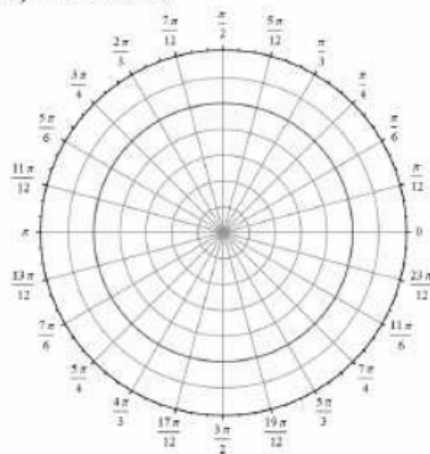
C) Graph the following: $y = -2\sin x$



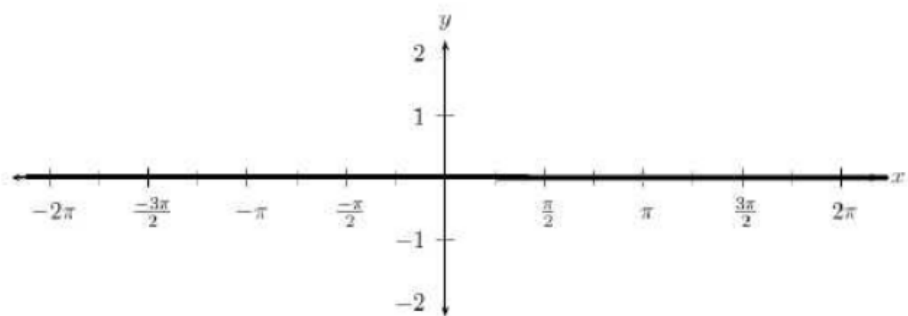
Graph the following polar curve: $r = -2\sin \theta$



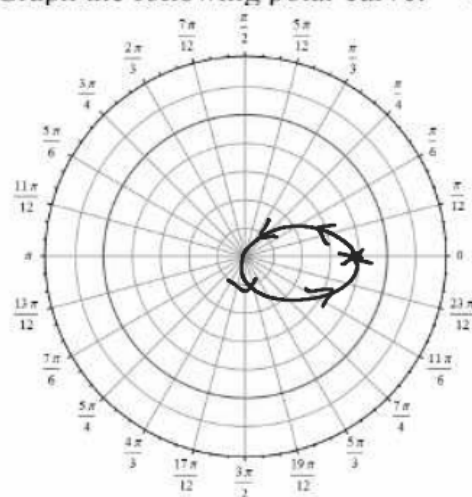
D) $r = -4\sin \theta$



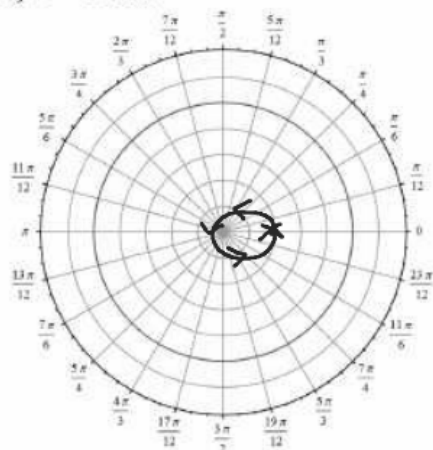
A) Graph the following: $y = 4\cos x$



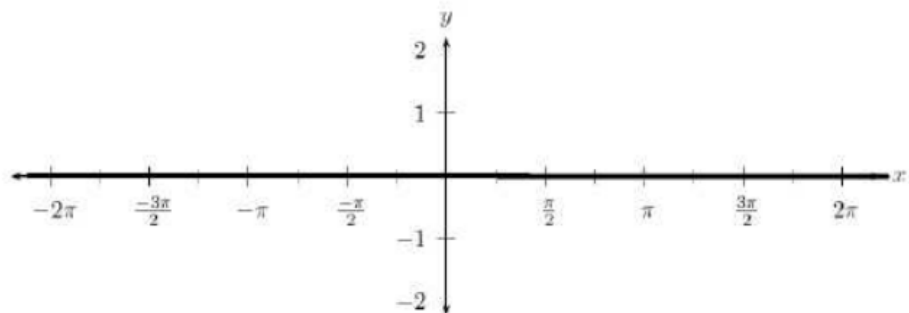
Graph the following polar curve: $r = 4\cos\theta$



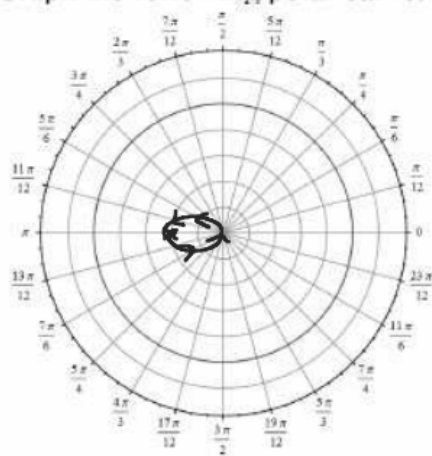
B) $r = 2\cos\theta$



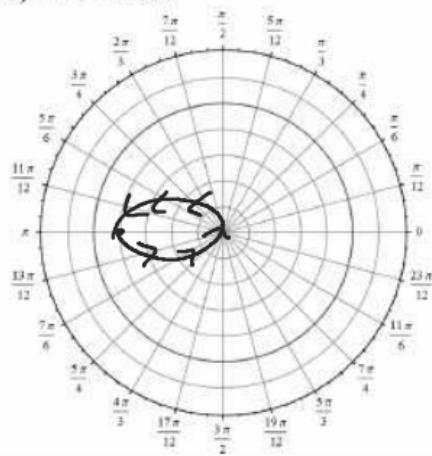
C) Graph the following: $y = -2\cos x$



Graph the following polar curve: $r = -2\cos \theta$



D) $r = -4\cos \theta$

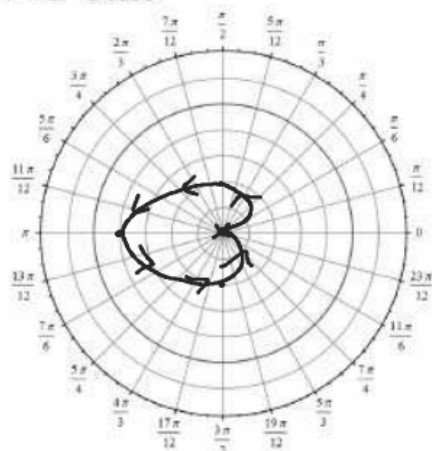


Summary of Polar Circles

- Circles always move counterclockwise
- The circle completes itself from 0 to π .
- Going from 0 to 2π would retrace the original circle
- The number in front of sine is the ~~radius~~
~~radius~~ ^{Diameter}
- Equations with positive sine start at the origin and then move counterclockwise up
- Equations with negative sine start at the origin and then move counterclockwise down
- Equations with positive cosine start at the ~~radius~~
~~radius~~ ^{Diameter} on the positive side of the pole and then move counterclockwise up and back toward the origin
- Equations with negative cosine start at the radius on the negative side of the pole and then move counterclockwise down and back toward the origin

Graph the following polar curve:

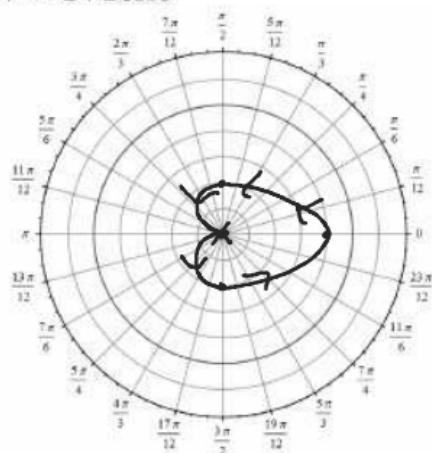
$$r = 2 - 2\cos\theta$$



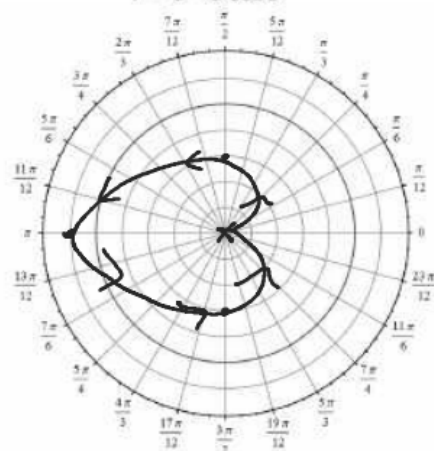
1. What is the value of r when $\theta = 0$?
2. What is the value of θ when $r = 0$?
2. What is the value of θ when $r = 2$?

Graph the following polar curve:

$$r = -2 + 2\cos\theta$$

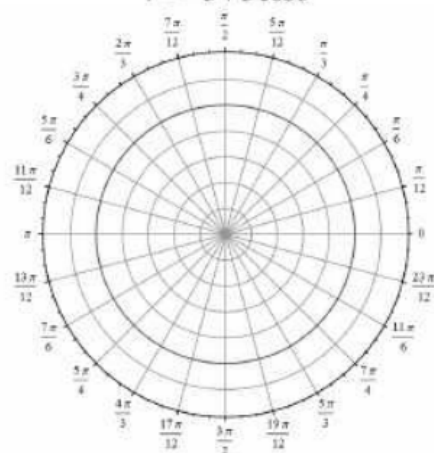


$$r = 3 - 3\cos\theta$$



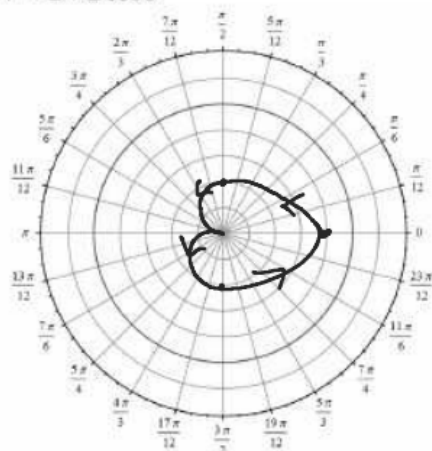
1. What is the value of r when $\theta = 0$?
2. What is the value of θ when $r = 0$?
2. What is the value of θ when $r = 3$?

$$r = -3 + 3\cos\theta$$



Graph the following polar curve:

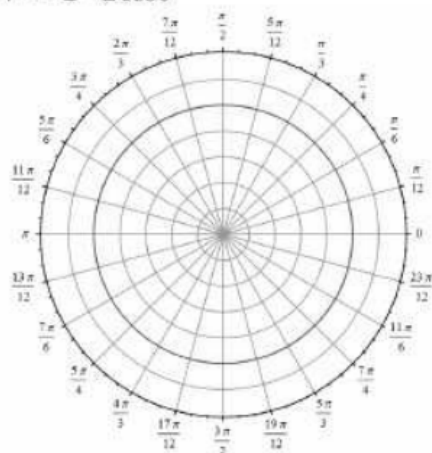
$$r = 2 + 2\cos\theta$$



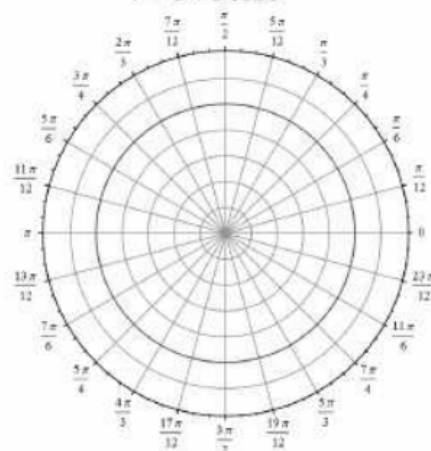
1. What is the value of r when $\theta = 0$?
2. What is the value of θ when $r = 0$?
2. What is the value of θ when $r = 2$?

Graph the following polar curve:

$$r = -2 - 2\cos\theta$$

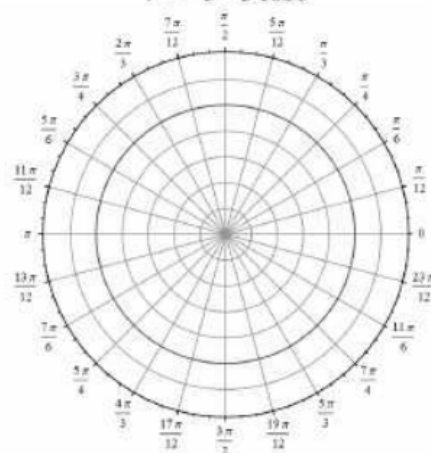


$$r = 3 + 3\cos\theta$$



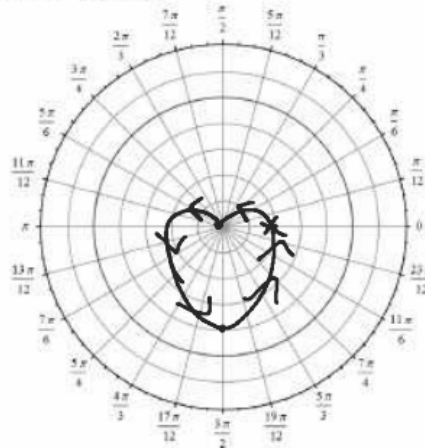
1. What is the value of r when $\theta = 0$?
2. What is the value of θ when $r = 0$?
2. What is the value of θ when $r = 3$?

$$r = -3 - 3\cos\theta$$



Graph the following polar curve:

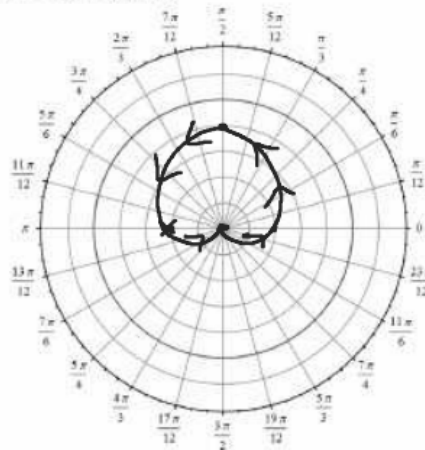
$$r = 2 - 2\sin\theta$$



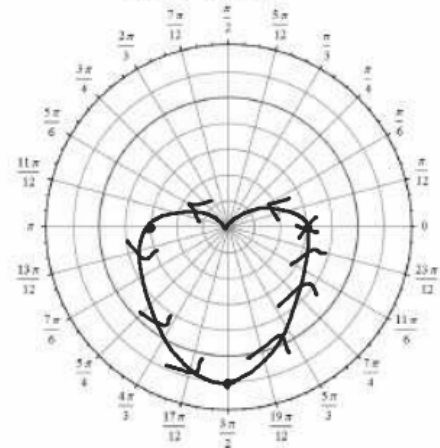
1. What is the value of r when $\theta = 0$?
2. What is the value of θ when $r = 0$?
2. What is the value of θ when $r = 2$?

Graph the following polar curve:

$$r = -2 + 2\sin\theta$$

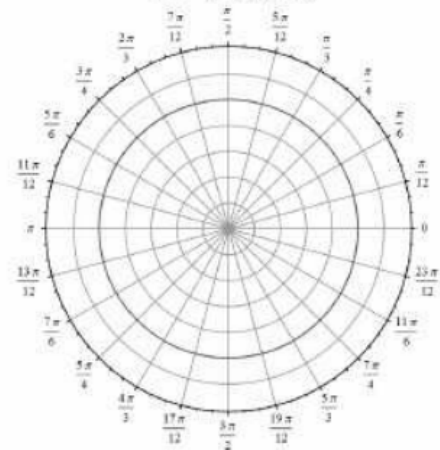


$$r = 3 - 3\sin\theta$$



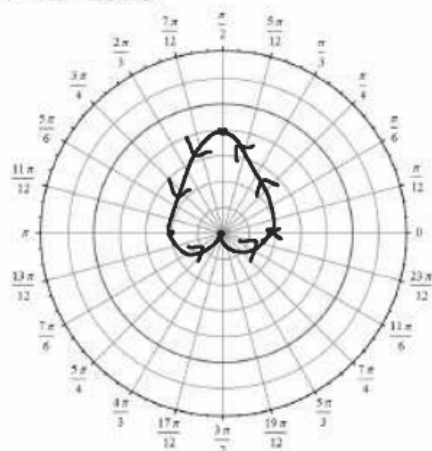
1. What is the value of r when $\theta = 0$?
2. What is the value of θ when $r = 0$?
2. What is the value of θ when $r = 3$?

$$r = -3 + 3\sin\theta$$



Graph the following polar curve:

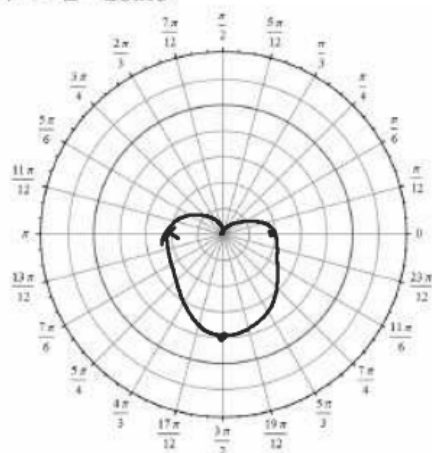
$$r = 2 + 2\sin\theta$$



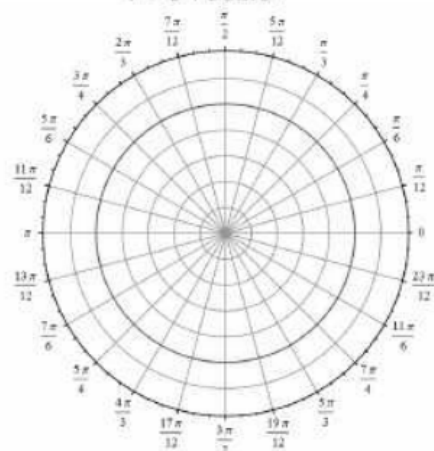
1. What is the value of r when $\theta = 0$?
2. What is the value of θ when $r = 0$?
2. What is the value of θ when $r = 2$?

Graph the following polar curve:

$$r = -2 - 2\sin\theta$$

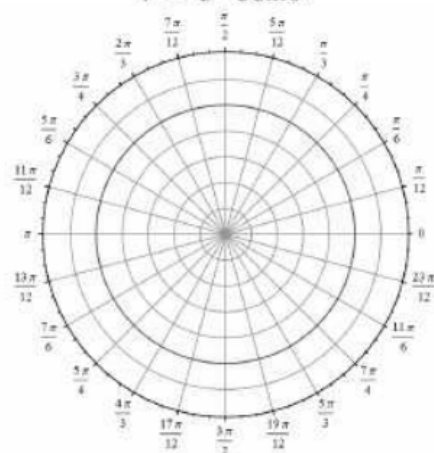


$$r = 3 + 3\sin\theta$$



1. What is the value of r when $\theta = 0$?
2. What is the value of θ when $r = 0$?
2. What is the value of θ when $r = 3$?

$$r = -3 - 3\sin\theta$$



Summary of the Cardioid: $r = \pm a \pm b \cos \theta$

- For a polar equation to be considered a cardioid, the values of $|a|$ and $|b|$ must be the same.
- Plug in $\theta = 0$. This will give you the value of r and where you will start moving counterclockwise.
- The value of a will tell you where the curve is at on the y-axis (when $\theta = \frac{\pi}{2}$ and $\theta = \frac{3\pi}{2}$)
- To complete the entire shape $0 \leq \theta \leq 2\pi$
- The value of $|a| + |b|$ will tell you how far out on the x-axis the curve is
- If b is negative the curve will be on the left side of the pole
- If b is positive the curve will be on the right side of the pole

Summary of the Cardioid: $r = \pm a \pm b \sin \theta$

- For a polar equation to be considered a cardioid, the values of $|a|$ and $|b|$ must be the same.
- Plug in $\theta = 0$. This will give you the value of r and where you will start moving counterclockwise.
- The value of a will tell you where the curve is at on the x-axis (when $\theta = 0$ and $\theta = \pi$)
- To complete the entire shape $0 \leq \theta \leq 2\pi$
- The value of $|a| + |b|$ will tell you how far out on the y-axis the curve is
- If b is negative the curve will be below the pole
- If b is positive the curve will be above the pole