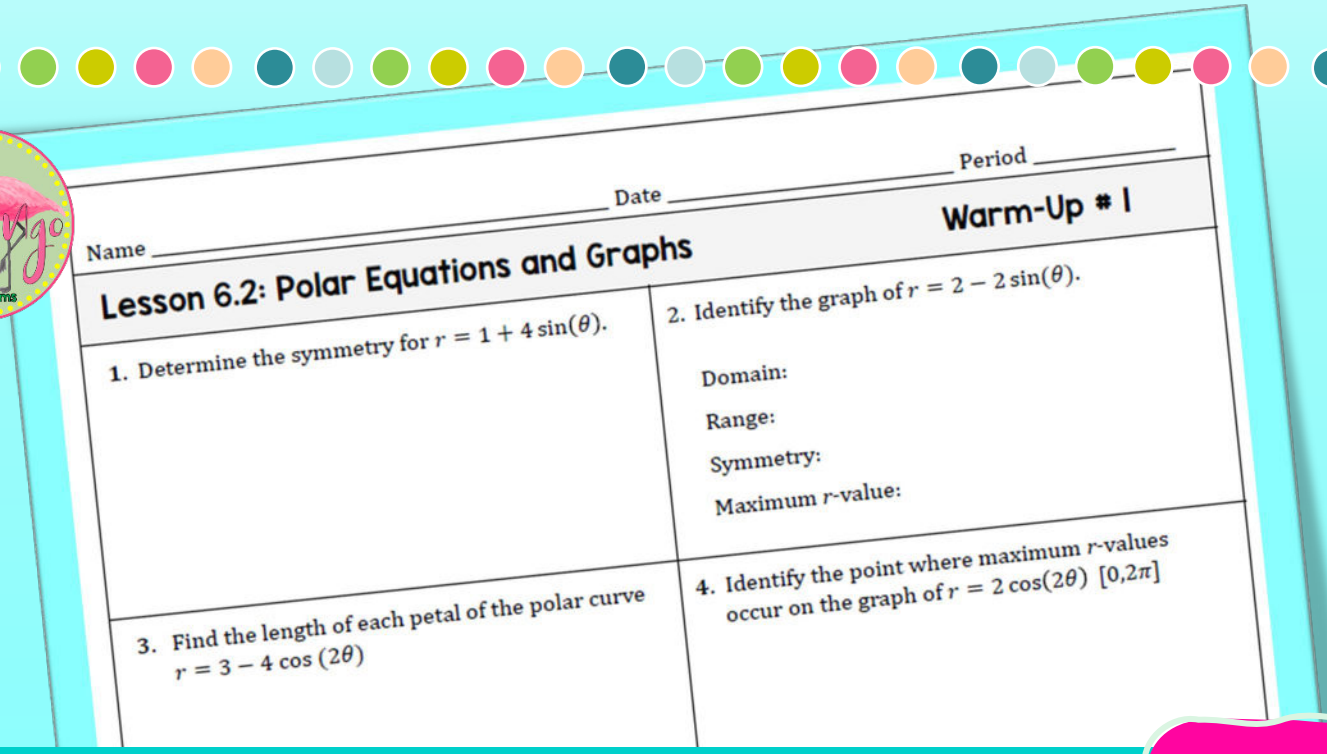
Precalculus Honors

Polar Coordinates and Vectors


Name _____ Date _____ Period _____

Lesson 6.2: Polar Equations and Graphs — **Warm-Up # 1**

1. Determine the symmetry for $r = 1 + 4\sin(\theta)$.

2. Identify the graph of $r = 2 - 2\sin(\theta)$.

   Domain:

   Range:

   Symmetry:

   Maximum r-value:

3. Find the length of each petal of the polar curve $r = 3 - 4\cos(2\theta)$

4. Identify the point where maximum r-values occur on the graph of $r = 2\cos(2\theta)$ $[0,2\pi]$

Warm-Ups 6

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PRECALCULUS CURRICULUM

Scope and Sequence

Unit 6: Polar Coordinates & Vectors

Lesson	Skills & Learning Objectives
[6.1] Polar Coordinates	❑ Convert points and equations from polar to rectangular form and vice versa
[6.2] Polar Graphs and Equations	❑ Graph Polar Equations ❑ Convert polar equations to rectangular form and vice versa ❑ Identify types of polar graphs from equations
[6.3] More About Polar Graphs	❑ Use auxiliary graphs to sketch polar curves ❑ Find negative *r*-values that create inner loops ❑ Find points of intersection in two polar graphs
[6.4] The Complex Plane; De Moivre's Theorem	❑ Represent complex numbers in the complex plane ❑ Write complex numbers in trigonometric form ❑ Find the conjugate of a complex number and moduli ❑ Find product and quotients of complex numbers ❑ Apply De Moivre's Theorem to find nth root of complex numbers
[6.5] Vectors in the Plane	❑ Apply the arithmetic of vectors ❑ Find component form, magnitude, and solve real-world problems ❑ Use vectors to solve real-world problems ❑ Find projection of vectors, angles between vectors
[6.6] The Dot Product	❑ Calculate dot products ❑ Find the angle between two vectors ❑ Finding vector components ❑ Find work done by a constant force

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Name _____ Date _____ Period _____

Lesson 6.1: Polar Coordinates — Warm-Up # 1

1. Find the rectangular coordinates for the polar point $P\left(3, \frac{\pi}{4}\right)$.

2. Given the point $Q(0, -2)$, find the polar coordinates.

3. Convert $r = 2\sin(\theta)$ to rectangular form. Identify the graph.

4. Name two different representations of the point on the interval of $[-2\pi, 2\pi]$ given $P = \left(3, \frac{\pi}{6}\right)$.

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Lesson 6.1: Polar Coordinates — Warm-Up # 2

1. Find the rectangular coordinates for the polar point $P\left(2, \frac{\pi}{6}\right)$

2. Given the point $Q(-3,0)$, find the polar coordinates.

3. Convert $r = 6\cos(\theta)$ to rectangular form. Identify the graph.

4. Name two different representations of the point on the interval of $[-2\pi, 2\pi]$ given $P = \left(-2, \frac{\pi}{3}\right)$

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Lesson 6.4: DeMoivre's and nth Root Theorem — Warm-Up # 1

1. Find the trigonometric form of the complex number $\mathbf{z} = 3 + i$, where the argument satisfies $0 \leq \theta \leq 2\pi$

2. Write the complex number

$$6\left(\cos\left(\frac{\pi}{6}\right) + i\sin\left(\frac{\pi}{6}\right)\right)$$

3. Find the product of the complex numbers:
$z_1 = 3[\cos(55°) + i\sin(55°)]$
$z_2 = 2[\cos(170°) + i\sin(170°)]$

4. Find $[2(\cos(15°) + i\sin(15°)]^2$

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Lesson 6.4: DeMoivre's and nth Root Theorem — Warm-Up # 2

1. Find the trigonometric form of the complex number $\mathbf{z} = \sqrt{2} + i$, where the argument satisfies $0 \leq \theta \leq 2\pi$

2. Write the complex number

$$8\left(\cos\left(\frac{\pi}{3}\right) + i\sin\left(\frac{\pi}{3}\right)\right)$$

3. Find the product of the complex numbers:
$z_1 = 4(\cos(60°) + i\sin(60°))$
$z_2 = 5(\cos(180°) + i\sin(180°))$

4. Find $[2(\cos(100°) + i\sin(100°)]^3$

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Lesson 6.5: Vectors in the Plane Day 1 — Warm-Up # 1

1. Let $\vec{\mathbf{u}} = \langle -5, 4 \rangle$ and $\vec{\mathbf{w}} = \langle 2, 3 \rangle$. Find the component form of the vector $3\mathbf{u} + \mathbf{w}$.

2. Use $\mathbf{v} = \langle 6, -3 \rangle$, find the magnitude of the vector.

3. Find the direction angle of the vector from #2.

4. Find the unit vector in the direction of the given vector $\langle 6, -3 \rangle$.

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Lesson 6.5: Vectors in the Plane Day 1 — Warm-Up # 2

1. Let $\vec{\mathbf{u}} = \langle -5, 4 \rangle$ and $\vec{\mathbf{w}} = \langle 2, 3 \rangle$. Find the component form of the vector $\mathbf{u} + 2\mathbf{w}$.

2. Use $\mathbf{v} = \langle 4, -5 \rangle$, find the magnitude of the vector.

3. Find the direction angle of the vector from #2.

4. Find the unit vector in the direction of the given vector $\langle 4, -5 \rangle$

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Lesson 6.5: Vector Applications Day 2 — Warm-Up # 1

1. A plane is flying on a bearing of 56° east of north at 500 mph. Express the velocity of the plane as a vector. Assume that there is no wind.

2. Find he components of the vector v with direction angle 175° and length of 10. Round you answer to two decimal places.

3. The magnitude and direction of two forces acting on an object are 43 pounds, N40°E, and 68 pounds, S38°E, respectively. Find the magnitude to the nearest hundredth of a pound.

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Lesson 6.5: Vector Applications Day 2 — Warm-Up # 2

1. A plane is flying on a bearing of 53° east of north at 485 mph. Express the velocity of the plane as a vector. Assume that there is no wind.

2. Find he components of the vector v with direction angle 215° and length of 9. Round you answer to two decimal places.

3. The magnitude and direction of two forces acting on an object are 41 pounds, N42°E, and 63 pounds, S55°E, respectively. Find the magnitude to the nearest hundredth of a pound.

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