 Name________________________

Polar Forms of Conic Sections

Date________________ Period____

Each polar equation describes a conic section with a focus at the origin. Find the eccentricity, find the equation of the directrix associated with the focus at the origin, and classify the conic section.

1) $r = \dfrac{0.8}{1 - 0.8\sin\theta}$

2) $r = \dfrac{1}{1 - \cos\theta}$

3) $r = \dfrac{2}{1 + 2\cos\theta}$

4) $r = \dfrac{10}{2 - 2\sin\theta}$

5) $r = \dfrac{8}{4 - 1.6\sin\theta}$

6) $r = \dfrac{14.4}{2 - 4.8\cos\theta}$

Each problem describes a conic section with a focus at the origin. Classify the conic section, and write the polar equation in standard form.

7) Eccentricity: 1
Directrix for focus at origin: $y = -6$

8) Eccentricity: 1.5
Directrix for focus at origin: $x = 2$

9) Eccentricity: 2.1
Directrix for focus at origin: $y = -3$

10) Eccentricity: 0.5
Directrix for focus at origin: $y = -2$

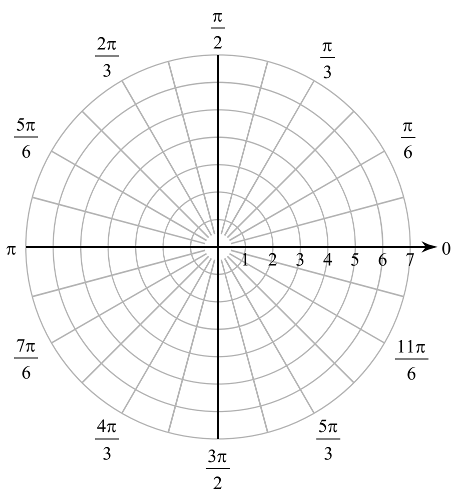
Each problem describes a conic section with a focus at the origin. Find the equation of the directrix associated with the focus at the origin, classify the conic section, and write the polar equation in standard form.

11) Eccentricity: 0.5
Vertices: $\left(0, \frac{4}{3}\right), (0, -4)$

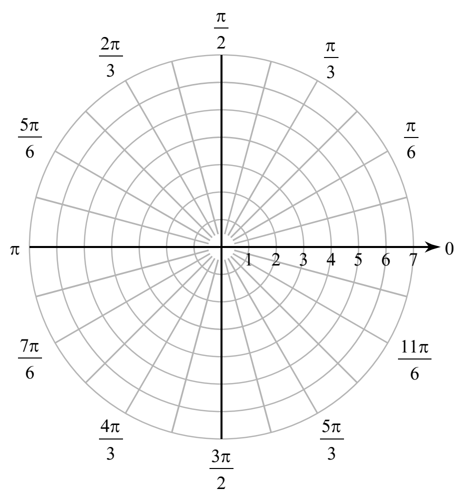
12) Eccentricity: 1
Vertex: $(-1, 0)$

Each polar equation describes a conic section with a focus at the origin. Find the eccentricity, find the equation of the directrix associated with the focus at the origin, classify the conic section, and graph the polar equation.

13) $r = \dfrac{19.8}{3 + 6.6\cos\ \theta}$



14) $r = \dfrac{9.6}{4 + 1.6\cos\ \theta}$



Critical thinking question:

15) Is it possible to use $r = \dfrac{ed}{1 + e\cos\ \theta}$ to represent a circle? Explain your answer.

Name________________________________

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Date________________ Period____

Each polar equation describes a conic section with a focus at the origin. Find the eccentricity, find the equation of the directrix associated with the focus at the origin, and classify the conic section.

1) $r = \dfrac{0.8}{1 - 0.8\sin\theta}$

Eccentricity: 0.8
Directrix: $y = -1$
Ellipse

2) $r = \dfrac{1}{1 - \cos\theta}$

Eccentricity: 1
Directrix: $x = -1$
Parabola

3) $r = \dfrac{2}{1 + 2\cos\theta}$

Eccentricity: 2
Directrix: $x = 1$
Hyperbola

4) $r = \dfrac{10}{2 - 2\sin\theta}$

Eccentricity: 1
Directrix: $y = -5$
Parabola

5) $r = \dfrac{8}{4 - 1.6\sin\theta}$

Eccentricity: 0.4
Directrix: $y = -5$
Ellipse

6) $r = \dfrac{14.4}{2 - 4.8\cos\theta}$

Eccentricity: 2.4
Directrix: $x = -3$
Hyperbola

Each problem describes a conic section with a focus at the origin. Classify the conic section, and write the polar equation in standard form.

7) Eccentricity: 1
Directrix for focus at origin: $y = -6$

Parabola
$r = \dfrac{6}{1 - \sin\theta}$

8) Eccentricity: 1.5
Directrix for focus at origin: $x = 2$

Hyperbola
$r = \dfrac{3}{1 + 1.5\cos\theta}$

9) Eccentricity: 2.1
Directrix for focus at origin: $y = -3$

Hyperbola
$r = \dfrac{6.3}{1 - 2.1\sin\theta}$

10) Eccentricity: 0.5
Directrix for focus at origin: $y = -2$

Ellipse
$r = \dfrac{1}{1 - 0.5\sin\theta}$

Each problem describes a conic section with a focus at the origin. Find the equation of the directrix associated with the focus at the origin, classify the conic section, and write the polar equation in standard form.

11) Eccentricity: 0.5
Vertices: $\left(0, \frac{4}{3}\right)$, $(0, -4)$

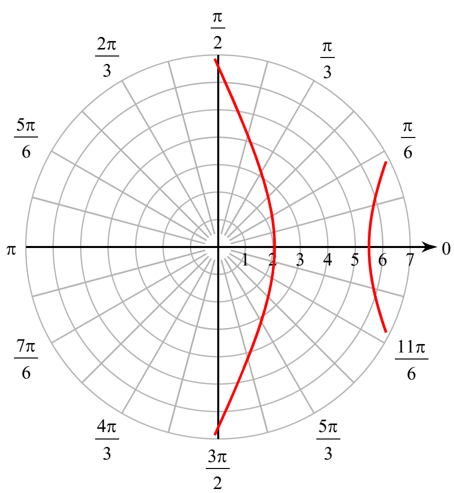
Directrix: $y = 4$
Ellipse
$r = \dfrac{2}{1 + 0.5\sin\,\theta}$

12) Eccentricity: 1
Vertex: $(-1, 0)$

Directrix: $x = -2$
Parabola
$r = \dfrac{2}{1 - \cos\,\theta}$

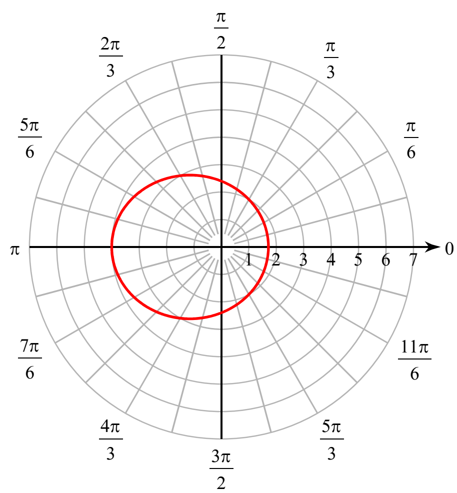
Each polar equation describes a conic section with a focus at the origin. Find the eccentricity, find the equation of the directrix associated with the focus at the origin, classify the conic section, and graph the polar equation.

13) $r = \dfrac{19.8}{3 + 6.6\cos\,\theta}$



Eccentricity: 2.2
Directrix: $x = 3$
Hyperbola

14) $r = \dfrac{9.6}{4 + 1.6\cos\,\theta}$



Eccentricity: 0.4
Directrix: $x = 6$
Ellipse

Critical thinking question:

15) Is it possible to use $r = \dfrac{ed}{1 + e\cos\,\theta}$ to represent a circle? Explain your answer.

No. Circles have an eccentricity of 0. This simplifies to $r = 0$ which is a single point.