**PreCalculus 10.8 Graphs of Polar Equations**

Graphing by plotting points:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0° | 30° | 45° | 60° | 90° | 120° | 135° | 150° | 180° | 210° | 225° | 240° | 270° | 300° | 315° | 330° | 360° |
| *r* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |



**Graph Symmetry** The graph is symmetric to …

1. to the line
2. to the polar axis
3. to the pole

Ex:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0° | 30° | 45° | 60° | 90° | 120° | 135° | 150° | 180° | 210° | 225° | 240° | 270° | 300° | 315° | 330° | 360° |
| *r* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |



**Zeros and Maximum *r*-values**

 Extreme values for sine and cosine:

 Find the maximum value for *r* in the equation:

 Find the zeros:

 Find the zeros:

Sketch the graph of:

 Maximum value or

 Zeros of *r*:

Window:



Sketch the graph of:

 Maximum value or

 Zeros of *r*:

Window:



Sketch the graph of:

 Maximum value or

Window:



Sketch the graph of:

 Maximum value or

 Zeros of *r*:

Window:



Other graphs:

Conic Sections

 parabola

 ellipse

 hyperbola

 circle

Spiral of Archimedes

Line