

Due at the beginning of class on the day of the Final Exam

Direction: Solve the problems in this worksheet on separate sheets of paper. Write your solution neatly. Use standard size paper. Clearly label each problem, and include each problem in the correct order. No ragged edges. Staple multiple pages. At the top of the first page put your name, Math 2414, and the title of the worksheet. Show all work to justify your answer. Answer with insufficient work will receive no credit.

Problem 1: Plot points with given polar coordinates

Plot the points whose polar coordinates are given

1. $(8, \pi/2)$

2. $(7, 5\pi/4)$

3. $(1, -3\pi/4)$

4. $(-2, 5\pi/3)$

Problem 2: Polar-to-Rectangular Conversion

Plot the point whose polar coordinates are given and find the corresponding rectangular coordinates for the point.

1. $(1, \pi)$

2. $(2, -2\pi/3)$

3. $(-\sqrt{2}, 5\pi/4)$

4. $(1, 5\pi/2)$

Problem 3: Rectangular-to-Polar Conversion

Plot the point whose rectangular coordinates are given and find the corresponding polar coordinates for the point.

1. $(2, 2)$

2. $(3, -\sqrt{3})$

3. $(-1, -\sqrt{3})$

4. $(0, -6)$

Problem 4: Plot a polar curve

Sketch the following curves:

1. $r = 2$

2. $\theta = \frac{\pi}{6}$

3. $r = 1 + 2 \cos \theta$

4. $r = 4 \sin(3\theta)$

Problem 5: Convert between polar equations and rectangular equations

Convert the polar equation to a rectangular equation and identify the curve.

1. $r = 3 \sin \theta$

2. $r = 3 \sec \theta$

3. $r = \sec \theta \tan \theta$

Problem 6: Tangent lines to polar curves

- Find dy/dx and the slope of the tangent line to the graph of $r = 2 + 3 \sin \theta$ at the points where $\theta = \pi/2$ and $\theta = \pi$.
- Find the points on the polar curve $r = 1 - \sin \theta$ where the tangent line is horizontal or vertical.
- Find the points on the polar curve $r = 1 + \cos \theta$ where the tangent line is horizontal or vertical.