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Worksheet-Review for Exam 3 Trigonometry Summer A 2016

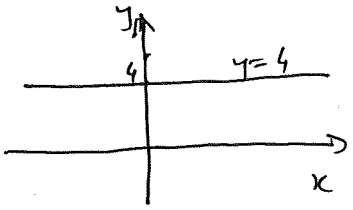
1. In each part, you are given the polar coordinates of a point. First plot the point, and then find the rectangular coordinates of each point. Finally, give two different polar coordinates representation of the same point.

(a) $(r = -5, \theta = \frac{\pi}{4})$ (b) $(r = 2, \theta = \frac{5\pi}{6})$

Do on your own

2. (a) Convert to rectangular coordinates $r = 4\csc\theta$ and graph the curve.

$r = \frac{4}{\sin\theta} \iff r\sin\theta = 4 \iff y = 4$



(b) Convert to rectangular coordinates $r = 6\cos\theta - 2\sin\theta$. Then complete the squares to show that the graph of the curve is a circle and graph the curve.

see class notes

3. Identify and make a rough sketch of each polar equation

(a) $r = 3 - 3\cos(\theta)$

cardioid

(b) $r = 5\sin(2\theta)$

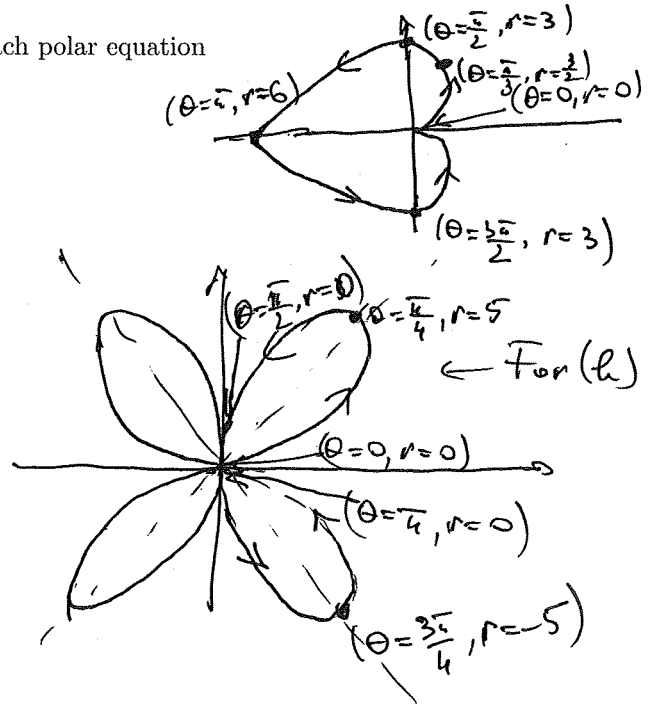
a 4-petal rose

(c) $r = 2\cos(3\theta)$.

a 3-petal rose

(but each petal is covered twice)

Do the graph on your own for c



4. Solve each of the following triangles. Specify if no solution, or more than one solution exist.

(a) Solve the triangle with $a = 3$, $b = 4$, $A = 20^o$. Law of Sines - 2 solutions possible

(b) Solve the triangle with angles $A = 10^o$, $C = 100^o$, and side $b = 2$. Law of Sines - 1 solution possible

(c) Solve the triangle with $a = 24$, $b = 26$, and $c = 10$. Law of Cosines

5. (a) Suppose that in a triangle we know two sides, a, b, and the angle C between them. Show that the area of the triangle is given by $A = \frac{ab \sin C}{2}$.

(b) Find the area of a rhombus with sides of 3 cm and one angle of 30^o. Also find the length of the diagonals of this rhombus.

Area $= \frac{9}{2}$ cm^2 $\quad d_1 = 3\sqrt{2-\sqrt{3}}$ cm $\quad d_2 = 3 \cdot \sqrt{2+\sqrt{3}}$ cm

6. Pbs. 52, 58, section 7.1 textbook.

7. Pbs. 39, 40, 41. section 7.2.

8. Solve each equation on the interval $0 \leq \theta < 2\pi$

a) $\sin\theta - \sqrt{3}\cos\theta = 0$ $\Leftrightarrow \sin\theta = \sqrt{3}\cos\theta \Leftrightarrow \tan\theta = \sqrt{3} \Leftrightarrow \theta = \frac{\pi}{3}$ or $\theta = \pi + \frac{\pi}{3} = \frac{4\pi}{3}$

b) $\cos\theta + \sin\theta = -\sqrt{2}$ $\rightarrow$ Answer $\theta = \frac{5\pi}{4}$ is the only solution

c) (Use the appropriate double angle formula first) $\sin(2\theta) = 2\sin\theta$ $\rightarrow$ Answer: $\theta = 0$ or $\theta = \pi$

d) (Use the appropriate double angle formula first) $\cos(2\theta) = 3 - \sin\theta$ $\rightarrow$ Answer: No solutions

e) (Use the appropriate identity first) $5(1 + \cos\theta) = \sin^2\theta$ $\rightarrow$ Answer $\theta = \pi$ is the only solution