



1. Find all solutions of the equations: (6 pts each)

a.  $2\cos\frac{x}{2} = \sqrt{2}$

b.  $\sin 2x = -\frac{\sqrt{3}}{2}$

2. Find all solutions in the interval  $[0, 2\pi]$ : (6 pts each)

a.  $\cot x \cos x = \cos x$

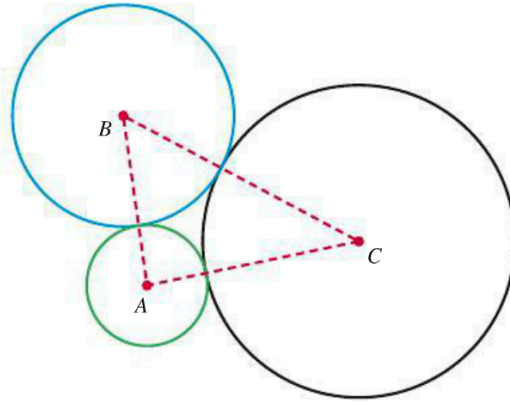
b.  $\cos^2 x - \sin^2 x + \sin x = 0$

c.  $-4\cos^2 x + 9 - 12\sin x = 0$

3. Find the standard equation and sketch the graph of the ellipse that has vertices at  $(0, \pm 6)$  and foci at  $(0, \pm 2\sqrt{6})$ . (5 pts)

4. Solve triangle ABC with  $C = 30^\circ$ ,  $b = 16\text{ft}$ , and  $c = 8\text{ ft}$ . (6 pts)

5. Three circles of radii 5, 6, and 7 inches are tangent to each other externally (meaning, they only touch each other at one point). Find the angles of the triangle formed by joining the center of the circles. \*You can leave your answer in trig function form(10 pts)



6. Find the area of the triangle with side lengths  $a = 4$ ,  $b = 6$ , and  $c = 4$  (5 pts)

7. Find the center and radius of the of the circle with equation (10 pts)

$$x^2 + y^2 + 4x - 6y - 12 = 0$$

8. A wheel of radius 4" rolls  $30\pi$ " to the left. The initial coordinates of a point on the rime of the wheel are  $P(\sqrt{6}, -\sqrt{10})$ . Find the final coordinates of the point after the rotation of the wheel. (12 pt)

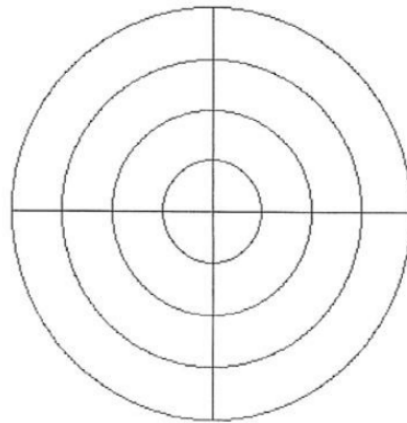
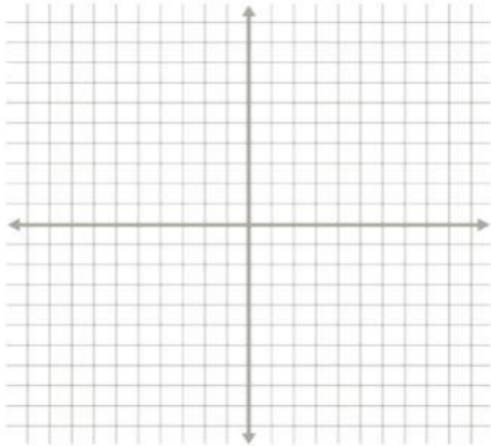
9. Convert the following polar equations into rectangular form: (5 pts)

a.  $\theta = \frac{5\pi}{6}$

b.  $r = 4\cos\theta$

10. Graph the following polar equations on the rectangular OR polar planes (6 pts each)

a.  $r = 5\sin\theta$



b.  $r = 2(1 + \sin\theta)$

