Note that the actual exam will be shorter

MAC 1114

EXAM 4

1.

(a) (5 points) Verify the identity

$$\cos\theta \cdot \csc\theta \cdot \tan\theta = 1$$
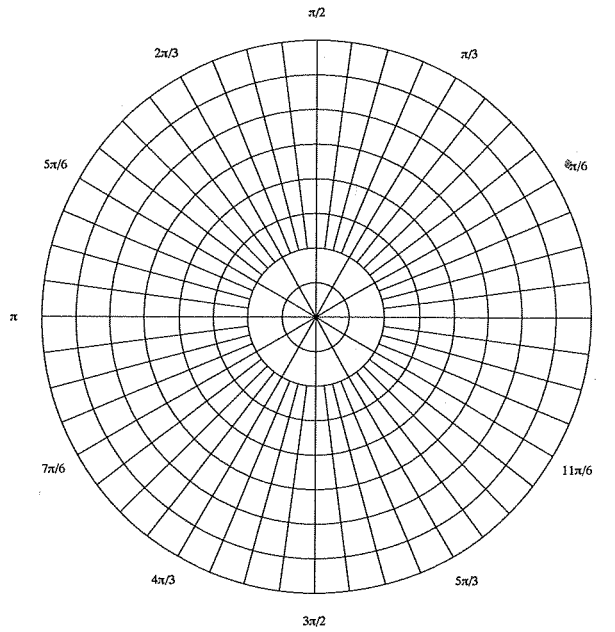
(b) (10 points) Verify the identity

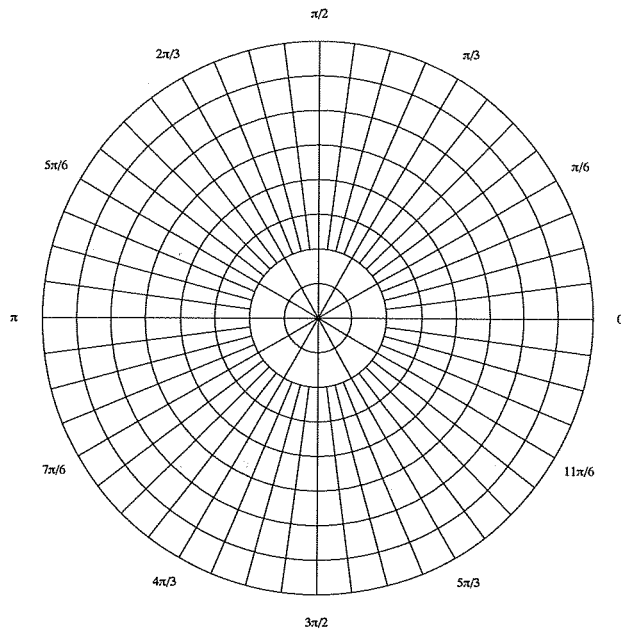$$\frac{\sec(2\theta) - \cos(2\theta)}{\sin^2(2\theta)} = \sec(2\theta)$$

EXAM 4

(c) (4 points) Find the exact value of $\sin^{-1}\left(\sin(\frac{5\pi}{6})\right)$. Explain your answer.

(d) (5 points) Find the exact value of $\tan\left(\sin^{-1}(-\frac{4}{5})\right)$.

(e) (5 points) Find the exact value of $\sin(75°)$

EXAM 4

$\boxed{2}$ (10 points) Plot the following points in polar coordinates

(a) (5 points) $\left(3, -\frac{2\pi}{3}\right)$

(b) (5 points) $\left(-2, \frac{5\pi}{6}\right)$

3 (10 points)

(a) (5 points) Find the rectangular coordinates of $(r, \theta) = (-2, 135°)$.

(b) (5 points) Find the polar coordinates of $(x, y) = (-2, 2)$ such that $r > 0$ and $0 \leq \theta \leq 2\pi$.

EXAM 4

(a) (10 points)   Convert the polar equation to a rectangular equation

$$r = 14 \sec \theta$$

(b) (10 points)   Convert the polar equation to a rectangular equation

$$r^2 \sin(2\theta) = 4$$

EXAM 4

5 (15 points) Solve the triangle with $a = 5$, $b = 5\sqrt{3}$, and $B = 60°$. You need to use either the law of sines or the law of cosines for this question, other methods will be disregarded.
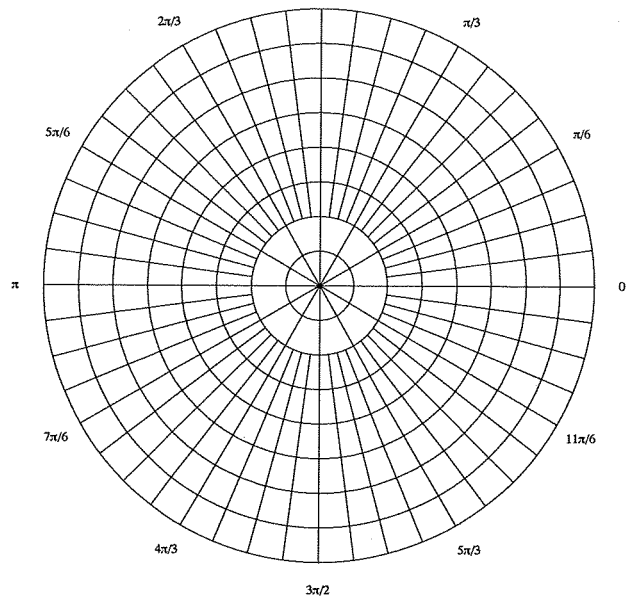
6 (10 points) Find the largest angle of the triangle with $a = 2$, $b = 2$, and $c = 2\sqrt{3}$. You need to use either the law of sines or the law of cosines for this question, other methods will be disregarded.

EXAM 4

7 (10 points)   Identify the polar graph (line, circle, cardioid, limacon, rose): If a circle, name the center and the radius. If a limacon, name the type. If a rose, state the number of petals.

(a) (5 points) $r = -5 \sin 3\theta$

(b) (5 points) $r = 4 \cos \theta$

8 (15 points)   Test for symmetry and graph the polar equation $r = 2 + 6 \cos(\theta)$
(note that $2 + 3\sqrt{3} \approx 7$, and $2 - 3\sqrt{3} \approx -3$, and $2 + 3\sqrt{2} \approx 6.2$, and $2 - 3\sqrt{2} \approx -2.2$)

EXAM 4

9 (20 points)   Test for symmetry and graph the polar equation

$$r = 8\cos(2\theta)$$

10 (20 points)   Test for symmetry and graph the polar equation
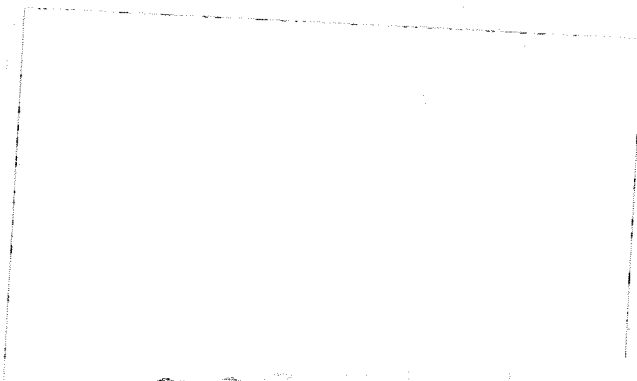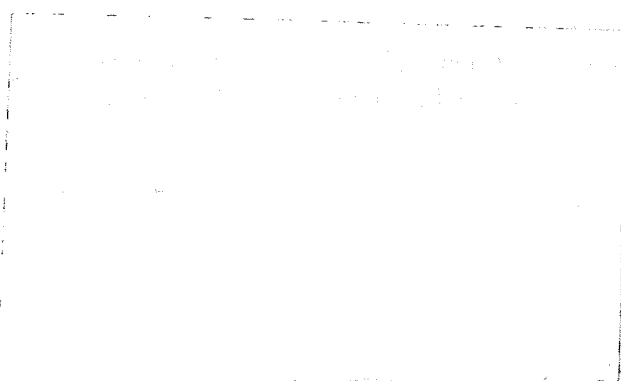
$$r = 3 - 4\sin(\theta)$$

EXAM 4

(a) (5 points) Find the quotient $\frac{z_1}{z_2}$. Leave the answer in polar form.

$$z_1 = 16(\cos 28° + i \sin 28°), \qquad z_2 = 8(\cos 4° + i \sin 4°)$$

(b) (5 points) Take the power of the following complex number. Leave the answer in polar form.

$$[5(\cos 105° + i \sin 105°)]^3$$

12 (15 points) Solve the triangle with $a = 6$, $C = 120°$, and $B = 30°$. You need to use either the law of sines or the law of cosines for this question, other methods will be disregarded.

13 (15 points) Solve the triangle with $a = 10$, $b = 30$, and $A = 150°$. You need to use either the law of sines or the law of cosines for this question, other methods will be disregarded.