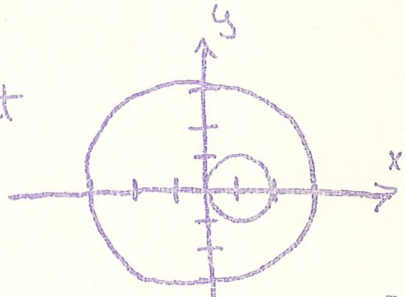
MATH 136 TEST I SHOW ALL WORK; BE NEAT; USE ONE SIDE OF EACH PAGE ONLY

1. For A(-5,7) and B(10,3):
   a) Find the coordinates of the midpoint of AB
   b) Find the length of AB.
2. Write the equation of a circle centered at (100, -0.1) with radius 7.
3. Graph $R = \{(x,y) \mid x^2+y^2 \leq 25 \text{ and } -1 \leq y \leq 1\}$ and give the domain and range of R.
4. Show that TUVW is a rhombus where T(10,10), U(15,6), V(10,2) and W(5,6)
5. Find the center and radius of the circle with the equation $x^2+y^2+10x-6y-8=0$
6. Describe using inequalities, the area inside the larger circle but outside the smaller circle. Each mark represents one unit.



7. Graph $\{(x,y) \mid x = 1+5\cos t,\ y = -1+5\sin t \mid \text{and } t \in [\frac{\pi}{2}, \frac{5\pi}{4}]\}$ and answer
   a) Is this a function?
   b) What are its range and domain?
8. Prove analytically: The diagonals of a parallelogram bisect each other.
9. Find the equation of the circle passing through (-2,4), (1,5) and (5,-3).
10. Find the equation of all points P(x,y) that are equidistant from A(0,0) and B(3,-2).

MATH 136 TEST II [illegible]

USE ONE SIDE OF EACH PAGE ONLY

1. Find the distance from $(4,2)$ to $5x-12y+30=0$.

2. For the line $12x-3y+36=0$ Find the x and y intercepts, the slope, a set of direction numbers, and the direction cosines.

3. For the parabola $y^2=4x$ find the equation or co-ordinates of the vertex, the axis, the directrix, the focus and the endpoints of the latus rectum.

4. For the line $\begin{cases} x = 1+4t \\ y = 2-3t \end{cases}$ give a set of direction numbers and the direction cosines

5. Find the distance between the parallel lines
$$5x-12y=50 \quad 5x-12y=11.$$

In 6,7,8 Find the equation of

6. The line through $(5,-2)$ parallel to $3x+4y+5=0$

7. The parabola with vertex at the origin, focus on the y-axis and passing through $(3,9)$.

8. The line perpendicular to the segment $A(3,-4)$ $B(-1,-3)$ and passing through the intersection of the lines $x+y=10$, $x-2y=1$.

9. Find $\tan\theta$ where θ is the angle between the lines $y=mx+1$ and $y=-mx-1$. When is $\theta=90°$? When is $\theta=45°$?

10. Graph $\{(x,y) \mid 3x-4y \le 12$ and $-y^2 \ge -3x\}$ and give its Range and Domain.

MATH 136 TEST III BE NEAT; SHOW ALL WORK; USE ONE SIDE OF EACH PAGE ONLY

1. determine which conic section given;
(a) $B^2-4AC=0$ $\Delta\neq 0$ (b) $B^2-4AC<0$ $\Delta=0$ (c) $B^2-4AC>0$ $\Delta\neq 0$
(d) $B^2-4AC>0$ $\Delta=0$ (e) $B^2-4AC<0$ $\Delta\neq 0$.

2. Find the equation of the ellipse (center at origin, symmetric with both axis) through (5,0) and (0,-4).

YES 3. For the ellipse $\frac{x^2}{144}+\frac{y^2}{169}=1$. Find the coordinates of foci and vertices and length of the latus rectum.

YES 4. For the hyperbola $\frac{x^2}{16}-\frac{y^2}{9}=1$. Find the coordinates of the foci and vertices and the equations of asymptotes

5. Find the equation of the rectangular hyperbola with one asymptote the x-axis, centered at the origin, through the point $(\sqrt{10}, 10\sqrt{10})$.

6.-9. Graph the equations (show all work)

6. $x^2+y^2-2x+4y-20=0$
7. $y^2-x^2-2y+2x=0$
8. $9x^2+25y^2-18x-50y-191=0$
9. $5x^2+6xy+5y^2-32x-32y+32=0$

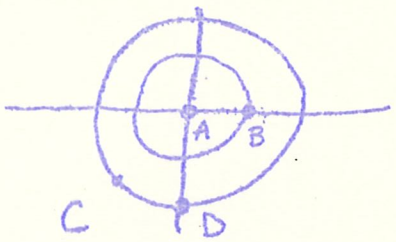
10. Find the equation of the hyperbola through (1,1) with asymptotes $y=\pm\frac{1}{2}x$

$A' = A\cos^2\theta + B\sin\theta\cos\theta + C\sin^2\theta$
$C' = A\sin^2\theta - B\sin\theta\cos\theta + C\cos^2\theta$
$D' = D\cos\theta + E\sin\theta$
$E' = E\cos\theta - D\sin\theta$
$F' = F$

MATH 136 TEST 4 SHOW ALL WORK; BE NEAT

USE ONE SIDE OF EACH PAGE ONLY.

1. GIVE ONE SET OF POLAR COORDINATES FOR A, B & C AND GIVE TWO SETS FOR D,



In 2&3 change the equations to polar coordinates

(1) 2. $x = 6$ 3. $x^2 + y^2 - 2x = 0$

In 4&5 change the equations to rectangular coordinates

(1) 4. $r^3 = \sin\theta$ 5. $r = 3\sin\theta\cos\theta$

6. Eliminate t from the parametric equations

$x = 1 + \cos t$ $y = 2 + 3\sin t$.

identify which conic section this equation represents,

7. Find the eccentricity of the following conics:

incorporate A. $x^2 + y^2 = 25$ B. $\frac{x^2}{25} + \frac{y^2}{16} = 1$ C. $y = x^2$

D. $\frac{y^2}{9} - \frac{x^2}{16} = 1$.

yes 8. Find coordinates for the points in common to both graphs of $r = \frac{1}{2}$ $r = \sin 2\theta$ (Show all work)

9. Graph $r = \frac{\theta}{2\pi}$ for θ in $[0, 6\pi]$

10. In polar coordinates, find the equation of the circle passing through the origin with center $(2, \frac{\pi}{4})$.

MATH 136 MAKE UP #4

1 A & B are in polar co-ordinates change to rectangular, C & D are in rectangular change to polar

A. $(0, \frac{\pi}{2})$ C. $(-1, 0)$

B $(2, -\frac{\pi}{4})$ D. ~~$(-1, 2)$~~ $(1, \sqrt{3})$

2 & 3 change to ~~rectan~~ polar coordinates

2. $x + y = 4$ 3. $x^2 + y^2 - 2x + 3y = 0$

4 & 5 change to rectangular cordinates

4. $r = \sin\theta + \cos\theta$ 5. $r^2 = \sin\theta \cos\theta$

6. Eliminate t from the parametric equations

$x = 1 - t$ $y = 1 - t^2$

identify which conic section this equation represents.

7. Find the eccentricity of the following conics

A. $\frac{(x-1)^2}{4} + \frac{(y+2)^2}{16} = 1$ B. $x = (y-1)^2$

C. $x^2 + y^2 = 1$ D. $xy = 1$.

8. Find the coordinates for the points in common to both graphs of $r = 1 + \sin\theta$ $r = 3\sin\theta$.

9. Graph $r = 2^{\frac{\theta}{2\pi}}$ for θ in $[-4\pi, 0]$

10. In <u>polar</u> coordinates, find the equation of the circle with center on $\theta = \frac{\pi}{4}$ passing through $(0,0)$ and $(2,0)$.

$r = 2\sqrt{2}\cos(\theta - \frac{\pi}{4})$

$\frac{2}{\sqrt{2}}$

MATH 136 FINAL SHOW ALL WORK; BE NEAT; USE ONE SIDE OF EACH PAGE ONLY.

1) For $A(5,5)$, $B(9,-1)$
   (a) Find the coordinates of the midpoint of AB
   (b) Find the length of AB
   (c) Find the slope of AB
   (d) Find a set of polar coordinates for A.

In 2-6 graph the given equation:

2) $y^2 - x + 1 = 0$

3) $16x^2 + 9y^2 - 18y - 135 = 0$

4) $y^2 - x^2 - 2y + 2x + 1 = 0$

5) $x^2 + y^2 + 2 = 0$

6) (polar coordinates) $r = \sin 3\theta$.

7) Find the center, radius and eccentricity of the circle $x^2 + y^2 + 6x - 14y + 9 = 0$

8) For the parabola $y^2 = x$, find the coordinates of the vertex and the focus, the eccentricity and the equation of the directix.

9) For the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$, find the coordinates of the foci and the vertices, and the eccentricity,

10) For the hyperbola $\frac{y^2}{144} - \frac{x^2}{25} = 1$, find the coordinates of the foci and the vertices, the eccentricity and the equations of the asymptotes

11) Find the distance between the parallel lines $6x + 8y = 7$ and $6x + 8y = -13$.

12) Find the equation of the perpendicular bisector to the line segment AB, where A(0,0) and B(4,-2).

13) Change the equation to polar coordinates

$$x^2+y^2 = \frac{xy}{x^2+y^2}$$

14) Change the equation to rectangular coordinates

$$r^2 = \tan\theta$$

15) Find the points in common in the graphs of the following (polar coordinate) equations

$$r = 3\sin\theta \qquad r = 1+\sin\theta$$

16) Find the equation of the line parallel to $x+y=0$ through the intersection of $2x+3y=10$ and the x-axis.

17) Eliminate t from the parametric equations

$$x = 1+\sin t \qquad y = 1-\cos t$$

which conic is this?

18) Graph $R = \{(x,y) \mid x^2+y^2 \le 4 \text{ and } 0 \le x+y\}$ what are the range and domain of R.

19) Prove analytically: the diagonals of a parallelogram bisect each other

20) Find the equation of the circle with center on the x-axis passing through the points (4,0) and (0,2).