Honors Algebra 2
Conics Review

Name Key

Hour ____

Identify the conic, put in standard form, find all components.

1. $9x^2 + 9y^2 + 6x + 18y + 9 = 0$

$\boxed{\text{CIRCLE}}$ center $(-\frac{1}{3}, -1)$ $\boxed{(x+\frac{1}{3})^2+(y+1)^2=\frac{1}{9}}$

radius $= \frac{1}{3}$

2. $4x^2 + 9y^2 - 24x - 36y + 36 = 0$ $\boxed{\frac{(x-3)^2}{9}+\frac{(y-2)^2}{4}=1}$

$\boxed{\text{H. ELLIPSE}}$ Vertices $(6,2)(0,2)$

center $(3,2)$ co-vertices $(3,4)(3,0)$

foci $(3 \pm \sqrt{5}, 0)$

3. $9x^2 - 16y^2 - 90x - 64y + 17 = 0$ $\boxed{\frac{(x-5)^2}{16}-\frac{(y+2)^2}{9}=1}$

$\boxed{\text{H. HYPERBOLA}}$ CV $(5,1)(5,-5)$

center $(5,-2)$ F $(10,-2)(0,-2)$

vertices $(9,-2)(1,-2)$ Asy: $y+2=\pm\frac{3}{4}(x-5)$

4. $x^2 - y^2 - 4x - 2y - 1 = 0$ $\boxed{\frac{(x-2)^2}{4}-\frac{(y+1)^2}{4}=1}$

$\boxed{\text{H. HYPERBOLA}}$ CV $(2,1)(2,-3)$

center $(2,-1)$ F $(2 \pm 2\sqrt{2}, -1)$

V $(4,-1)(0,-1)$ Asym: $y+1=\pm 1(x-2)$

5. $3x^2 + 2y^2 - 24x + 42 = 0$

$\boxed{\text{ELLIPSE}}$ CV $(4+\sqrt{2}, 0)(4-\sqrt{2}, 0)$ $\boxed{\frac{(x-4)^2}{2}+\frac{y^2}{3}=1}$

C $(4,0)$ F $(4,1)(4,-1)$

V $(4,\sqrt{3})(4,-\sqrt{3})$

6. $y - 3x^2 + 6x - 1 = 0$ $\boxed{y+2=3(x+1)^2}$

$\boxed{\text{V. PARABOLA (UP)}}$

V $(-1,-2)$ dir: $y=-2\frac{1}{12}$

F $(-1,-1\frac{11}{12})$ AOS: $x=-1$

Find the equation in standard form given the following:

7. A parabola with Focus (11,-1) and Directrix y = 2.

$y-\frac{1}{2}=-\frac{3}{2}(x-11)^2$

8. A parabola with Vertex (2,-3), Dir. x = 1

$x-\frac{3}{2}=\frac{1}{2}(y+3)^2$

9. A parabola with Vertex (2,0) and Focus (-1,0).

$x-2=-3y^2$

10. An ellipse with F($\pm$4,0) and sum of major axis equal to 18. $\frac{x^2}{81}+\frac{y^2}{65}=1$

11. A hyperbola with Foci $(-\sqrt{2},0)$ *and* $(\sqrt{2},0)$ and asymptotes y = x and y = -x. $\frac{x^2}{1}-\frac{y^2}{1}=1$

12. A hyperbola having Foci (0,-1) and (0,9) and conjugate axis equal to 8

$\frac{(y-4)^2}{9}-\frac{x^2}{16}=1$

13. An ellipse having Foci (2,0) and (2,6) and minor axis equal to 4 $\frac{(x-2)^2}{4}+\frac{(y-3)^2}{13}=1$

14. A circle with endpoints of the diameter (-1,3) and (-17, 5).

$(x+9)^2+(y-4)^2=65$

15. a circle with center $(-4,7)$ & tangent to the $y-axis$

$(x+4)^2+(y-7)^2=16$

16. ellipse whose center is , its major axis is 10 units long and parallel to the x-axis , and its minor axis is 6 units long. $\frac{(x-h)^2}{25}+\frac{(y-k)^2}{9}=1$

17. Find the midpoint and distance between each set of points:

A. (–2, 8) and (–3, –5)

$m(-\frac{5}{2},\frac{3}{2})$ $d=\sqrt{170}$

B. $(5\sqrt{2}, 3\sqrt{3})$ *and* $(4\sqrt{8}, -2\sqrt{12})$

$m(\frac{13\sqrt{2}}{2}, \frac{-\sqrt{3}}{3})$ $d=\sqrt{165}$

C. (-5, 8) and (13, 4)

$m(4,6)$ $d=2\sqrt{85}$

18. Suppose Point C is the center of a circle and point T is the point of tangency. Write the slope intercept equation for the line tangent to the circle at the point of tangency.

A. C(–2, 8) and T(–3, –5) $y=-\frac{1}{13}x-\frac{68}{13}$

B. C(-5, 8) and T(13, 4) $y=\frac{9}{2}x-\frac{109}{2}$

19. Let A(-3,9), M(2,-7). Find B if M is the midpoint of $\overline{AB}$. B(7,-23)

20. Given points (-6,4), (c,7) and the distance between the points is 5, find c. $c=-10$ or $c=-2$

21. Complete the charts. Graph each equation.

Equation	Standard Form	Center	Radius
A) $x^2+14x+y^2+2y=-40$	$(x+7)^2+(y+1)^2=10$	$(-7,-1)$	$\sqrt{10}$
B) $x^2+y^2-10x+8y+16=0$	$(x-5)^2+(y+4)^2=25$	$(5,-4)$	5

Equation	Standard Form	Opening	Vertex	Axis of Symmetry	Focus	Directrix
C) $y=x^2+4x+3$	$y+1=(x+2)^2$	$\uparrow$	$(-2,-1)$	$x=-2$	$(-2,-\frac{3}{4})$	$y=-1\frac{1}{4}$
D) $y^2-4y-2=x+3$	$(y-2)^2=x+9$	$\rightarrow$	$(-9,2)$	$y=2$	$(-8\frac{3}{4},2)$	$x=-9\frac{1}{4}$
E) $x=-\frac{1}{4}(y+1)^2-3$	$x+3=-\frac{1}{4}(y+1)^2$	$\leftarrow$	$(-3,-1)$	$y=-1$	$(-4,-1)$	$x=-2$

Equation	Standard Form	Center	Foci	Vertices	Co-Vertices
F) $x^2+4y^2+24y=-32$	$\frac{x^2}{4}+\frac{(y+3)^2}{1}=1$	$(0,-3)$	$(\pm\sqrt{3},-3)$	$(2,-3)$ $(-2,-3)$	$(0,-2)$ $(0,-4)$
G) $\frac{(x-3)^2}{1}+\frac{(y-1)^2}{36}=1$	$\frac{(x-3)^2}{1}+\frac{(y-1)^2}{36}=1$	$(3,1)$	$(3,1\pm\sqrt{35})$	$(3,7)$ $(3,-5)$	$(4,1)$ $(2,1)$
H) $x^2+25y^2-8x+100y+91=0$	$\frac{(x-2)^2}{25}+\frac{(y+2)^2}{1}=1$	$(2,-2)$	$(2\pm2\sqrt{6},-2)$	$(7,-2)$ $(-3,-2)$	$(2,-1)$ $(2,-3)$

Equation	Standard Form	Center	Foci	Vertices	Eq. of Asymptotes
I) $\frac{(x-1)^2}{64}-\frac{(y+4)^2}{16}=1$	$\frac{(x-1)^2}{64}-\frac{(y+4)^2}{16}=1$	$(1,-4)$	$(1\pm4\sqrt{5},-4)$	$(-7,-4)$ $(9,-4)$	$y=\frac{1}{2}x-4\frac{1}{2}$ $y=-\frac{1}{2}x-3\frac{1}{2}$
J) $4y^2-x^2-16y+2x+11=0$	$\frac{(y-2)^2}{1}-\frac{(x-1)^2}{4}=1$	$(1,2)$	$(1,2\pm\sqrt{5})$	$(1,3)$ $(1,1)$	$y=\frac{1}{2}x+1\frac{1}{2}$ $y=-\frac{1}{2}x+2\frac{1}{2}$

Identify the conic. You must provide work and explanation that backs up your choice.

22. $15x^2-6xy+9y^2-12x-12y+15=0$

Ellipse

PRACTICE STORY PROBLEMS!!!!!!! See p. S 41 in the student handbook pages, individual sections from the book and/or review pages in the book for practice on story problems.