**Identifying Conics Practice**

1. Identify the following as CONIC or NON-CONIC. If, in fact, an equation is a conic, identify which type of conic it is (circle, ellipse, hyperbola, parabola).

a. $3x^{2}+3y^{2}-6x+2y-7=0$

b. $3x^{2}-3y^{2}-6x+2y-10=0$

c. $8x^{2}+2y^{2}+6x+2y+2=0$

d. $3x^{2}-0y^{2}+2x-y+7=0$

e. $0x^{2}-0y^{2}-4x+y+4=0$

f. $-x^{2}+y^{2}-2x+3y-5=0$

g. $2x^{2}+2y^{2}+0x-0y=0$

h. $x^{2}-y^{2}+0x+0y=0$

2. Given the following conditions upon the equation $Ax^{2}+Cy^{2}+Dx+Ey+F=0$, which conic is represented?

a. $A=C\ne 0$

b. $AC>0, A\ne C$

c. $A=0, C\ne 0$

d. $A<0, C>0$

e. $AC<0, A=-C$

f. $AC>0, A=C$

g. $A>0, C>0, A\ne 0$

h. $AC<0$

i. $AC=0, A<0$

j. $A>C>0$

3. With respect to the general conic equation $ Ax^{2}+Cy^{2}+Dx+Ey+F=0$, in each of the following, determine the restriction upon the given variables in order for the desired result to be true:

a. A circle with its centre in Quadrant II; $A, C, D, E$ only.

b. An ellipse with its major axis on the $x$-axis. $A, C, E$ only.

c. A parabola that opens down with an axis of symmetry *not* on the $y$-axis. $A, C, D, E$ only.

d. A hyperbola with its transverse axis on the $y$-axis. $A, C, D$ only.

Multiple-Choice Questions

4. Which conic is described by the equation $3x^{2}+3y^{2}+5x-12y=0$ ?

a. hyperbola b. ellipse c. parabola d. circle

5. For which value of constant $C$ will the equation $3x^{2}+Cy^{2}=24$ represent an ellipse?

a. $C=-3$ b. $ C=0$ c. $ C=3$ d. $C=6$

6. Which conic is represented by the equation $Ax^{2}+Cy^{2}+Dx+Ey+F=0$ if $A=-C$ and $\ne 0$ ?

a. circle b. parabola c. ellipse d. hyperbola

7. What condition must be satisfied if the ellipse $Ax^{2}+Cy^{2}+Ey=1$, with $A>0, C>0, A\ne C$, and where the major axis is on the $x$-axis?

a. $A<C, E\ne 0$ b. $A>C, E\ne 0$ c. $A<C, E=0$ d. $A>C, E=0$

8. If $Ax^{2}+Cy^{2}=1$ is a hyperbola, determine values for $A$ and $C$ such that the hyperbola has its vertices on the $x$-axis.

a. $A>0, C>0$ b. $A>0, C<0$ c. $A<0, C>0$ d. $A<0, C<0$

9. Determine the values of the constants $A, C, $and $D$ so that the equation $ $

$Ax^{2}+Cy^{2}+Dx+Ey=0$ represents a parabola with a horizontal axis of symmetry.

a. $ A=0, C\ne 0, D\ne 0$ b. $A=0, C=0, D\ne 0$

c. $ A\ne 0, C\ne 0, D=0$ d. $A=0, C\ne 0, D=0$

10. Determine restrictions on the constants such that $Ax^{2}+Cy^{2}+Dx+Ey+F=0$ represents a parabola that opens down.

a. $AE<0, C=0$ b. $AE>0, C=0$ c. $CD<0, A=0$ d. $CD>0, A=0$

11. Determine restriction on the constants such that $Ax^{2}+Cy^{2}+Dx+Ey=0$ represents a parabola that has its vertex on the $y$-axis and opens *down*.

a. $C=D=0, AE>0$ b. $C=D=0, AE<0$

c. $A=E=0, CD>0$ d. $A=E=0, CD<0$

12. Determine the best answer for $F$ such that $4x^{2}+2y^{2}+8x-12y+F=0$ is an ellipse.

a. $F<10$ b. $F>10$ c. $F<22$ d. $F>22$

**Solutions**

1. a. circle b. hyperbola c. ellipse d. parabola e. non-conic (line)

f. hyperbola g. non-conic (point) h. non-conic (intersecting lines)

2. a. circle b. ellipse c. parabola d. hyperbola e. hyperbola

f. circle g. ellipse h. hyperbola i. parabola j. ellipse

3. a. $A>0, C>0, D>0, E<0$ b. $C>A>0, E=0$

c. $A>0, C=0, D\ne 0, E>0$ d. $AC<0, A<0, C>0, D=0$

4. d 5. d 6. d 7. c 8. b 9. a 10. b 11. a 12. c