





### 7-33 Eccentricity & Discriminant

Eccentricity  $e = \frac{c}{a}$

$0 < \text{ellipse} < 1$        $1 < \text{hyperbola} < \infty$   
                  

Discriminant to determine Conic Section

General Form for any Conic Section

$$Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$$

$$\text{Discriminant} = B^2 - 4AC$$

circle:  $B^2 - 4AC < 0$        $B=0$  and  $A=C$

ellipse:  $B^2 - 4AC < 0$        $B \neq 0$  and/or  $A \neq C$

parabola:  $B^2 - 4AC = 0$

hyperbola:  $B^2 - 4AC > 0$

HW: 449 9, 11, 21, 41  
453 14, 15, 20

EX:  $4x^2 + 3y^2 - 2x + 5y - 60 = 0$       Shape?

$0^2 - 4(4)(3) < 0$        $A \neq B$  ellipse

EX:  $2y^2 + 6x + 3y + 4xy + 2x^2 - 88 = 0$

$4^2 - 4(2)(2) = 0$       parabola