Precalc 10.2

Determine and use standard form for the equation of a circle*
Determine and use general form for the equation of a circle*
Graph circles*

*Alg 2 Ch. 10 (also Geometry)

circle — in a plane all pts. given distance (r) from fixed pt (center)

radius

center

concentric

conic section

ellipse — slice not ⊥ circle - slice ⊥ to alt.

parabola — slice // to side

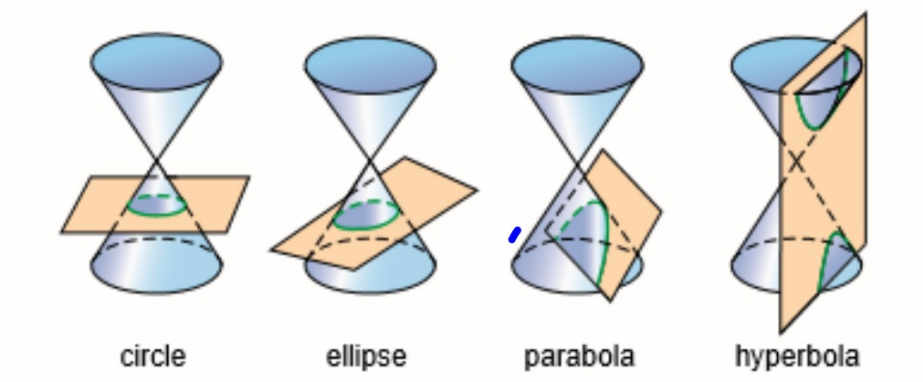
hyperbola — // to alt

degenerate conic

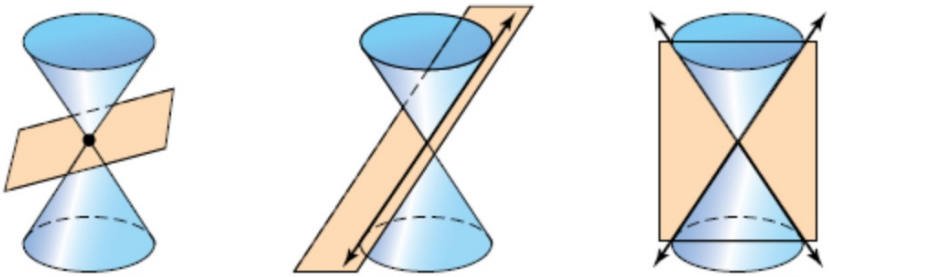
completing the square

nappe

conic models
activity: sidewalk chalk
whiteboards


circle
ellipse
parabola
hyperbola

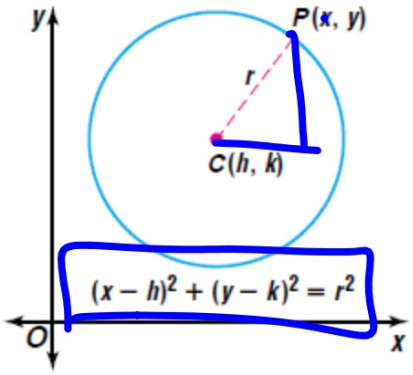
When the plane does pass through the vertex of a conical surface, as illustrated below, the resulting figure is called a **degenerate conic.** A degenerate conic may be a point, line, or two intersecting lines.



point (degenerate ellipse) line (degenerate parabola) intersecting lines (degenerate hyperbola)

Meh…

Sidewalk chalk



$(x-h)^2 + (y-k)^2 = r^2$

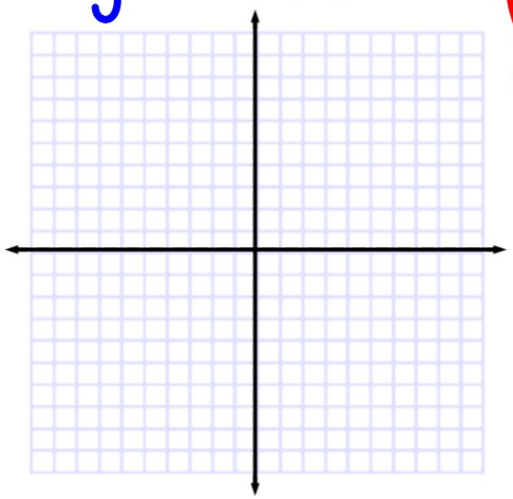
Standard Form of the Equation of a Circle	The standard form of the equation of a circle with radius r and center at (h, k) is $$(x - h)^2 + (y - k)^2 = r^2.$$

Write the standard form of the equation of each circle described. Then graph the equation.

6. center at $(0, 0)$, radius 9

$(x-0)^2 + (y-0)^2 = (9)^2$

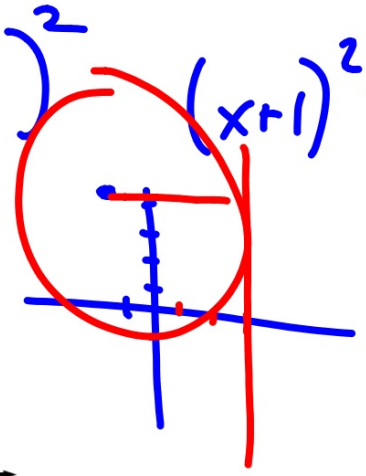
$x^2 + y^2 = 81$



7. center at $(-1, 4)$ and tangent to $x = 3$

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

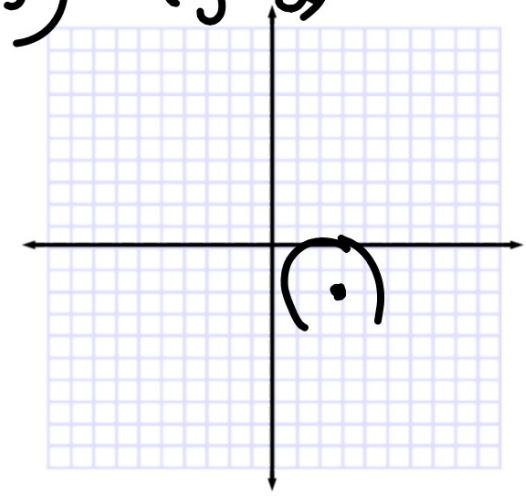
$= 16$



What do we need to know to answer the question?
One picture is worth 1000 words...

1 **Write the standard form of the equation of the circle that is tangent to the x-axis and has its center at $(3, -2)$. Then graph the equation.**

$(x-3)^2 + (y+2)^2 = 4$



General Form of the Equation of a Circle

The general form of the equation of a circle is

$$x^2 + y^2 + Dx + Ey + F = 0,$$

where D, E, and F are constants.

Multiply out all terms
Arrange in this order

What do we need to know?

CTS

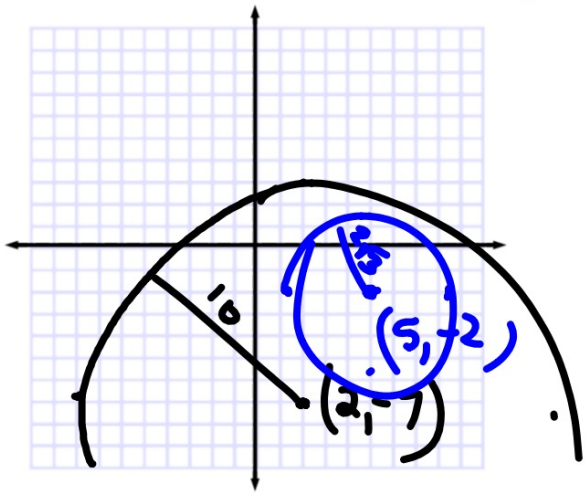
Write the standard form of each equation. Then graph the equation.

8. $x^2 + y^2 - 4x + 14y - 47 = 0$

9. $2x^2 + 2y^2 - 20x + 8y + 34 = 0$

$(x^2-4x+4)+(y^2+14y+49) = 47+4+49$

$(x-2)^2+(y+7)^2 = 100$



$+25$ -17 $+4$

$(x^2-10x+25)+(y^2+4y+4) =$

$(x-5)^2+(y+2)^2 = 12$

$r \approx 3.5$

What do we need to know?

3 The equation of a circle is $2x^2 + 2y^2 - 4x + 12y - 18 = 0$.

a. Write the standard form of the equation.

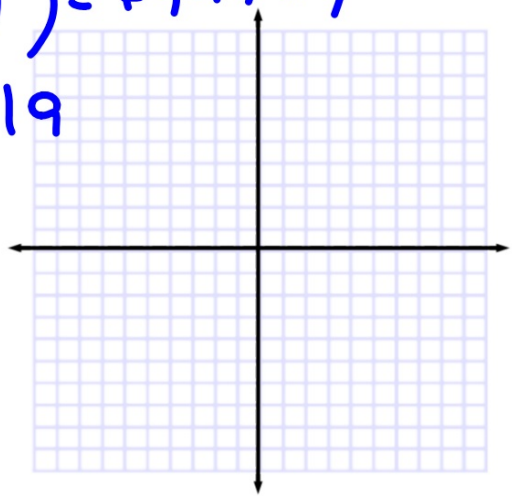
b. Find the radius and the coordinates of the center.

c. Graph the equation.

$(x^2-2x+1)+(y^2+6y+9)=+9+1+9$

$(x-1)^2+(y+3)^2=19$

$r=\sqrt{19}$ $C=(1,-3)$

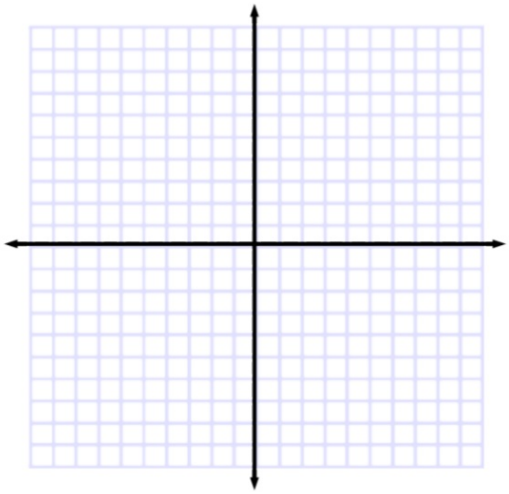


Tough: system of 3 equations
What do we need to know?

15-25 o
35, 37, 39

4 **Write the standard form of the equation of the circle that passes through the points at (5, 3), (−2, 2), and (−1, −5). Then identify the center and radius of the circle.**

General Form of the Equation of a Circle	The general form of the equation of a circle is $x^2 + y^2 + Dx + Ey + F = 0,$ where D, E, and F are constants.



Use technology to solve

How can we leverage technology to help?
Matrices! :)