

Circles in the Coordinate Plane (Section 3-12)

* Standard Form of a circle: $(x-h)^2 + (y-k)^2 = r^2$

where (h,k) : vertex

r : radius

* A circle centered @ the origin: $x^2 + y^2 = r^2$

ex: $x^2 + y^2 = 1$; left 5 & down 3

$$(x+5)^2 + (y+3)^2 = 1$$

↑ left 5 ↑ down 3

ex: $x^2 + y^2 = 25$; right 2 & down 4

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

↑ Right 2 ↑ down 4

ex: $(x+8)^2 + (y+3)^2 = 121$

center: $(-8, -3)$

radius: $r^2 = 121$
 $r = 11$

ex: $(x+6)^2 + y^2 = 49$

center: $(-6, 0)$

radius: $r^2 = 49$
 $r = 7$

* To graph: find the center & radius.

plot the center

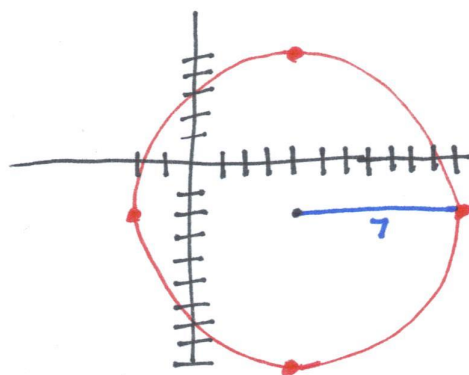
move " r " units up/down/L/R

make a circle.

ex: $(x-4)^2 + (y+2)^2 = 49$

center: $(4, -2)$

radius: $r^2 = 49$
 $r = 7$



Circles in General Conic Form Notes (Section 3-12) Date _____ Period _____

Use the information provided to write the standard form equation of each circle. Then identify the center and radius.

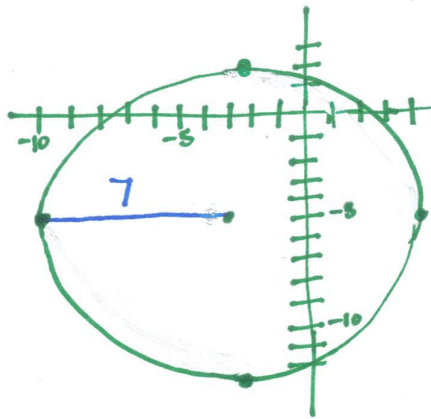
1) $x^2 + y^2 + 6x + 10y - 15 = 0$

$$(x^2 + 6x + 9) + (y^2 + 10y + 25) = 15 + 9 + 25$$

$$\frac{+6}{2} = (+3)^2 \quad \frac{+10}{2} = (+5)^2$$

$$(x+3)^2 + (y+5)^2 = 49$$

vertex: $(-3, -5)$
radius: $r^2 = 49$
 $r = 7$



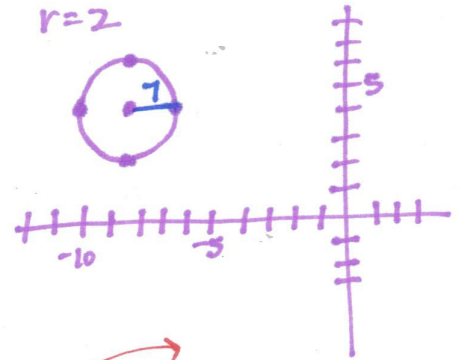
2) $x^2 + y^2 + 18x - 8y + 93 = 0$

$$(x^2 + 18x + 81) + (y^2 - 8y + 16) = -93 + 81 + 16$$

$$\frac{+18}{2} = (+9)^2 \quad \frac{-8}{2} = (-4)^2$$

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

vertex: $(-9, 4)$
radius: $r^2 = 4$
 $r = 2$



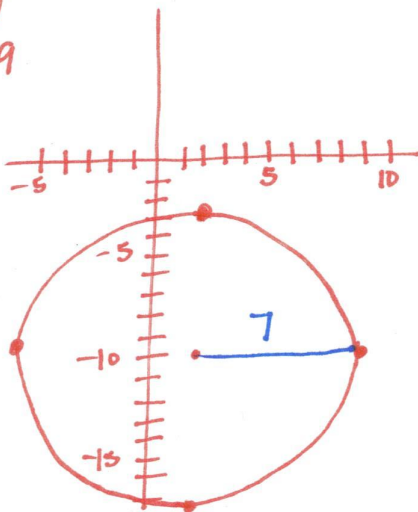
3) $x^2 + y^2 - 4x + 20y + 55 = 0$

$$(x^2 - 4x + 4) + (y^2 + 20y + 100) = -55 + 4 + 100$$

$$\frac{-4}{2} = (-2)^2 \quad \frac{+20}{2} = (+10)^2$$

$$(x-2)^2 + (y+10)^2 = 49$$

vertex: $(2, -10)$
radius: $r^2 = 49$
 $r = 7$



4) $x^2 + y^2 - 12x - 32y + 291 = 0$

$$(x^2 - 12x + 36) + (y^2 - 32y + 256) = -291 + 36 + 256$$

$$\frac{-12}{2} = (-6)^2 \quad \frac{-32}{2} = (-16)^2$$

$$(x-6)^2 + (y-16)^2 = 1$$

vertex: $(6, 16)$
radius: $r^2 = 1$
 $r = 1$

