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

Finding the equation of the circle is important!

1. A circle has a radius of 2 and a center of (2, -3). Will the following points lie on the circle?

   a. (2, -5)

   $(2-2)^2+(-5+3)^2=2^2$

   $0+4=4$

   $4=4$ yes!

   b. (3, -1)

   $(3-2)^2+(-1+3)^2=2^2$

   $(1)^2+(2)^2=4$

   $1+4=4$

   $5=4$ Not on the circle outside ⊙

2. Casey's dartboard is a circle centered at the origin with a radius of 8 inches. He throws 3 darts:

   a) The first dart hits $(-3,5)$.

   b) The second dart hits $(4,8)$

   c) The third dart hits $(2\sqrt{5}, 2\sqrt{11})$

   Are his darts inside, outside, or on the board?

   $(x-h)^2+(y-k)^2=r^2$ (0,0)

   $\boxed{(x-0)^2+(y-0)^2=64}$

   a) $(-3-0)^2+(5-0)^2=64$

   $(-3)^2 \quad (5)^2$

   $9+25=64$

   $34=64$ (inside)

   b) $(4-0)^2+(8-0)^2=64$

   $(4)^2 \quad (8)^2$

   $16+64=64$

   $80=64$ (outside)

   c) $(2\sqrt{5}-0)^2+(2\sqrt{11}-0)^2=64$

   $(2\sqrt{5})^2+(2\sqrt{11})^2=64$

   $4\cdot(5) \quad 4(11)$

   $20+44=64$

   $64=64$ (on)

3. The new Georgia Dome is being built in the region w/ equation:

   $x^2+y^2-6x+20y-39{,}891=0$

   $x^2-6x+\underline{9}+y^2+20y+\underline{100}=39{,}891+\underline{9}+\underline{100}$

   Several churches in the area are protesting that the church might interfere with their building:

   $(x-3)^2+(y+10)^2=40{,}000$

   Mount Vernon Baptist is located at: $(\overset{x}{100},\overset{y}{105})$

   Friendship Baptist Church is located at: $(\overset{x}{-174},\overset{y}{-58})$

   (a) If the churches lie within the area of the new stadium, what should the Falcons do?

   (b) How much would be a fair price? (opinion)

   MVB: $(100-3)^2+(105+10)^2=40{,}000$

   $22{,}634=40{,}000$

   FBC: $(-174-3)^2+(-58+10)^2=40{,}000$

   $33{,}633=40{,}000$

   They are both inside the area

4. The Space Race in the 1960's between The Soviets and The Americans was a race to see who could get a spacecraft to the moon first. The moon has a 2-dimensional region of:

   $x^2+y^2+882x-166y+90{,}345=0$

   $x^2+882x+\underline{194{,}481}+y^2-166y+\underline{6889}=-90{,}345+\underline{194{,}481}+\underline{6889}$

   $(441)^2 \quad (-83)^2$

   $(x+441)^2+(y-83)^2=111{,}025$

   Russia shoots a rocket that lands at: $(\overset{x}{-100},\overset{y}{80})$

   USA shoots a rocket that lands at: $(\overset{x}{-400},\overset{y}{-200})$

   Which country "won" the space race (landed on the moon)?

   Russia: $(-100+441)^2+(80-83)^2=111{,}025$

   $116{,}290=111{,}025$ (over shoots)

   larger means outside the area of moon

   USA: $(-400+441)^2+(-200-83)^2=111{,}025$

   $81{,}770=111{,}025$ (lands on the Moon)

   small is inside the area for Moon

Radius

5. A furniture store (at the origin) advertises free delivery within a 50 mile radius from the store. If a customer lives 28 miles east and 41 miles north of the store, does the customer qualify for free delivery?

(28, 41) Center

$(x-28)^2+(y-41)^2 = 50^2$
2500

(a) What if they lived 30 miles west and 41 miles south?

(−30, −41)
x y

$(-30-28)^2+(-41-41)^2=2500$
$3364+6724=2500$
$10,088=2500$ outside the area!

(b) What about 50 miles west?

(−50, 0) $(-50-28)^2+(0-41)^2=2500$
$6084+1681=2500$
$7765=2500$
nope – outside of area!

6. Clowns are roaming around different areas of Acworth. One clown is at $x^2+6x+y^2-31=0$

And the other clown is roaming a center of (−2, −2) with a radius of 4 miles.

$x^2+6x+\_+y^2=31+\_$
$(x+3)^2+y^2=40$ C1

$(x--2)^2+(y--2)^2=(4)^2$ (h, k, r = 4)
C2 $\Rightarrow (x+2)^2+(y+2)^2=16$

Your house is at (6, 0)

C1 $(6+3)^2+(0)^2=40$
$81=40$ outside

C2 $(6+2)^2+(0+2)^2=16$
$64+4=68=16$ outside

Will anyone be attacked by clowns?

Your House is Safe from Clowns! ☺

Your friends house is at (3, -3)

C1 $(3+3)^2+(-3)^2=40$
$36+9$
$45=40$ outside

C2 $(3+2)^2+(-3+2)^2=16$
$25+1=16$
$25=16$ outside

Your Friends House is Safe from Clowns! ☺

Coach Harrison's house is at (2.3, 4.1)

C1 $(2.3+3)^2+(4.1)^2=40$
$28.09+16.81=40$
$44.9=40$
outside

C2 $(2.3+2)^2+(4.1+2)^2=16$
$18.49+37.21=16$
$55.7=16$
outside

Coach Harrison is Safe! ☺