

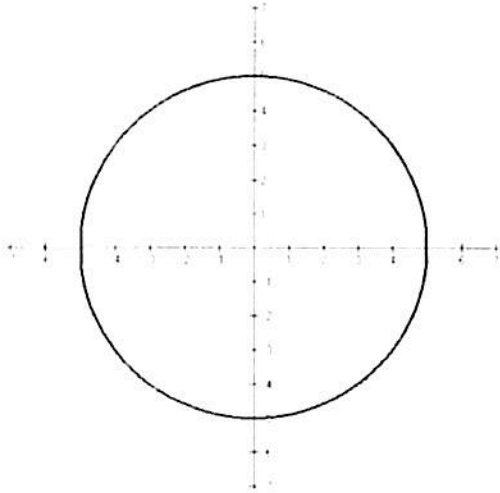
Equations of Circles
Geometry

Name Key
Period _____ Date _____

1. How do we identify an equation is a circle?

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

2. $x^2 + y^2 = 25$



A. What is the radius of the circle? 5

B. What is the correlation between the radius and the equation?

radius squared in equation

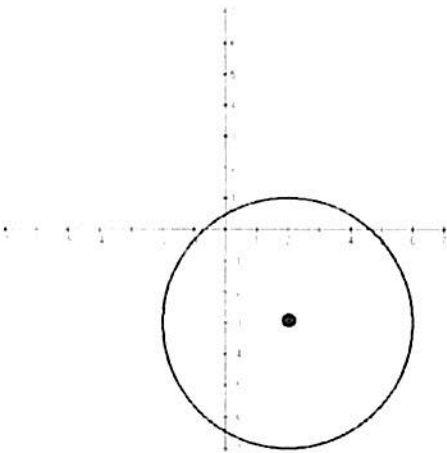
C. What do we have to do to the radius before we put it in the equation?

square it

D. What is the center?

$$(h,k) \rightarrow (0,0)$$

3. $(x-2)^2 + (y+3)^2 = 16$



A. What is the radius of the circle? 4

B. What is the correlation between the radius and the equation?

square root of equation

C. Is this the same process as question #2c? Explain.

yes

D. What is the center?

$$(2, -3)$$

E. Do you see a correlation between the center and the equation? Explain.

yes, opp. #s (signs)

4. Name the center and radius of the following:

a. $(x+4)^2 + (y-5)^2 = 36$

$$(-4, 5) \quad r=6$$

b. $(x-2)^2 + (y+1)^2 = 49$

$$(2, -1) \quad r=7$$

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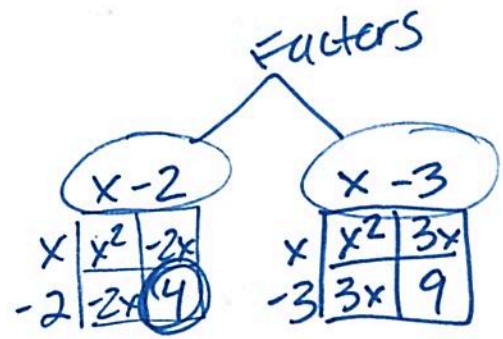
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Completing the Square Practice



1) $x^2 + y^2 - 4x - 6y + 9 = 0$

① $(x^2 - 4x) + (y^2 - 6y) = -9$

② $(x^2 - 4x + \underline{4}) + (y^2 - 6y + \underline{9}) = -9 + \underline{4} + \underline{9}$

③ $(x-2)^2 + (y-3)^2 = 4$

$$\boxed{C = (2, 3) \quad r = 2}$$

2) $x^2 + y^2 - 4x + 12y - 7 = 0$

$(x^2 - \frac{4x}{2} + \frac{4}{2}) + (y^2 + \frac{12y}{2} + \frac{36}{2}) = 7 + \underline{4} + \underline{36}$

$(x-2)^2 + (y+6)^2 = 47$

$$\boxed{C = (2, -6) \quad r = \sqrt{47}}$$

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

$(x^2 - \frac{2x}{2} + \frac{1}{2}) + (y^2 + \frac{4y}{2} + \frac{4}{2}) = -4 + \underline{1} + \underline{4}$

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

$$\boxed{C = (1, -2) \quad r = 1}$$

* on your own

4) $x^2 + y^2 - 4x + 6y + 9 = 0$

SKIP
(same
as #1)

~~$(x^2 - \frac{4x}{2} + \frac{4}{2^2}) + (y^2 + \frac{6y}{2} + \frac{9}{3^2}) = -9 + \frac{4}{2} + \frac{9}{3}$~~

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

~~$C = (2, -3) \quad r = 2$~~

5) $x^2 + y^2 - 10x + 12y + 51 = 0$

$(x^2 - \frac{10x}{2} + \frac{25}{2^2}) + (y^2 + \frac{12y}{2} + \frac{36}{6^2}) = -51 + \frac{25}{2} + \frac{36}{6}$

	-5
x ²	-5x
-5	25

$(x-5)^2 + (y+6)^2 = 10$

$C = (5, -6) \quad r = \sqrt{10}$

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

6) The equation of a circle in the xy-plane is shown above. What is the radius of the circle?

- A) 2
- B) 3
- C) 4
- D) 9

$(x^2 + 4x + 4) + (y^2 - 2y + 1) = -1 + \frac{4}{2} + \frac{1}{1}$

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