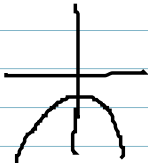
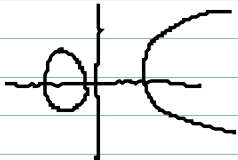

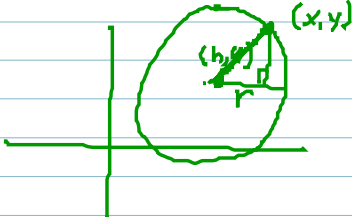
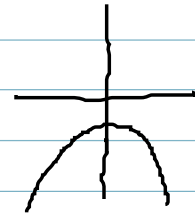


	$\underline{3x^2 - 5y = 7}$		
✓ y-axis	$3(-x)^2 - 5y = 7 \rightarrow 3x^2 - 5y = 7$		
x x-axis	$3x^2 - 5(-y) = 7 \rightarrow 3x^2 + 5y = 7$		
x origin	$3(-x)^2 - 5(-y) = 7 \rightarrow 3x^2 + 5y = 7$		
	$\underline{4x^3 - 7x = 6y^4 + 1}$		
xy-axis	$4(-x)^3 - 7(-x) = 6y^4 + 1 \rightarrow -4x^3 + 7x = 6y^4 + 1$		
✓ x-axis	$4x^3 - 7x = 6(-y)^4 + 1 \rightarrow 4x^3 - 7x = 6y^4 + 1$		
x origin	$4(-x)^3 - 7(-x) = 6(-y)^4 + 1 \rightarrow -4x^3 + 7x = 6y^4 + 1$		
	$\underline{5x^5 - 3x^3 = 7y^3 + 4y}$		
xy-axis	$5(-x)^5 - 3(-x)^3 = 7y^3 + 4y \rightarrow -5x^5 + 3x^3 = 7y^3 + 4y$		
x x-axis	$5x^5 - 3x^3 = 7(-y)^3 + 4(-y) \rightarrow 5x^5 - 3x^3 = -7y^3 - 4y$		
✓ origin	$5(-x)^5 - 3(-x)^3 = 7(-y)^3 + 4(-y) \rightarrow (-5x^5 + 3x^3) = (-7y^3 - 4y)$ $(-1) \quad (-1)$	$5x^5 - 3x^3 = 7y^3 + 4y$	
<hr style="border: 1px solid green;"/> <p><u>Circle</u> - collection of points in a plane that are equidistant from a common center point</p> <p>radius - r center - (h, k)</p> <div style="text-align: center;">  </div> <p><u>standard</u> - $d = \sqrt{(x-h)^2 + (y-k)^2}$</p> <p>$r^2 = (x-h)^2 + (y-k)^2$</p> <div style="float: right; text-align: center;"> <p>Center = $(0, 0)$</p> <p>$x^2 + y^2 = r^2$</p> <p>unit circle</p> <p>$x^2 + y^2 = 1$</p> </div>			

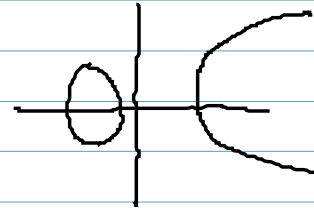
$$\underline{3x^2 - 5y = 7}$$

✓ y-axis	$3(-x)^2 - 5y = 7 \rightarrow 3x^2 - 5y = 7$
x x-axis	$3x^2 - 5(-y) = 7 \rightarrow 3x^2 + 5y = 7$
x origin	$3(-x)^2 - 5(-y) = 7 \rightarrow 3x^2 + 5y = 7$



$$\underline{4x^3 - 7x = 6y^4 + 1}$$

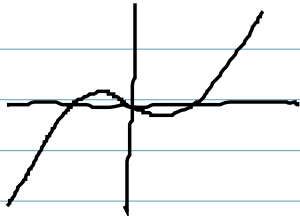
x y-axis	$4(-x)^3 - 7(-x) = 6y^4 + 1 \rightarrow -4x^3 + 7x = 6y^4 + 1$
✓ x-axis	$4x^3 - 7x = 6(-y)^4 + 1 \rightarrow 4x^3 - 7x = 6y^4 + 1$
x origin	$4(-x)^3 - 7(-x) = 6(-y)^4 + 1 \rightarrow -4x^3 + 7x = 6y^4 + 1$



$$\underline{5x^5 - 3x^3 = 7y^3 + 4y}$$

x y-axis	$5(-x)^5 - 3(-x)^3 = 7y^3 + 4y \rightarrow -5x^5 + 3x^3 = 7y^3 + 4y$
x x-axis	$5x^5 - 3x^3 = 7(-y)^3 + 4(-y) \rightarrow 5x^5 - 3x^3 = -7y^3 - 4y$
✓ origin	$5(-x)^5 - 3(-x)^3 = 7(-y)^3 + 4(-y) \rightarrow (-5x^5 + 3x^3) = (-7y^3 - 4y)$

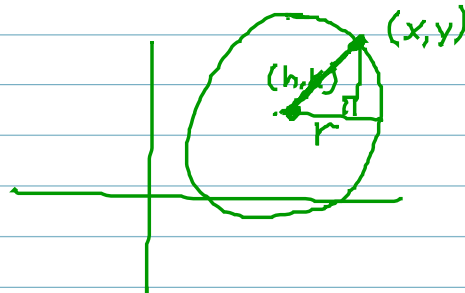
$$5x^5 - 3x^3 = 7y^3 + 4y$$



Circle - collection of points in a plane that are equidistant from a common center point

radius - r

center - (h, k)



standard - $d = \sqrt{(x-h)^2 + (y-k)^2}$

$$\underline{r^2 = (x-h)^2 + (y-k)^2}$$

center = $(0, 0)$

$$\underline{x^2 + y^2 = r^2}$$

unit circle

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

General - $x^2 + y^2 + ax + by + c = 0$

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

$$\underline{x^2 - 2hx + h^2} + \underline{y^2 - 2ky + k^2} = r^2$$

$$x^2 + y^2 - 2hx - 2ky + h^2 + k^2 - r^2 = 0$$

$$a = -2h \quad b = -2k \quad c = h^2 + k^2 - r^2$$

$$x^2 + y^2 + ax + by + c = 0$$

$$\underline{x^2 + ax + \left(\frac{a}{2}\right)^2} + \underline{y^2 + by + \left(\frac{b}{2}\right)^2} = -c + \left(\frac{a}{2}\right)^2 + \left(\frac{b}{2}\right)^2$$

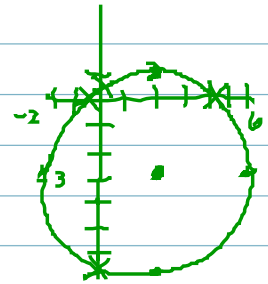
$$\left(x + \frac{a}{2}\right)^2 + \left(y + \frac{b}{2}\right)^2 = -c + \left(\frac{a}{2}\right)^2 + \left(\frac{b}{2}\right)^2 = -c + \frac{a^2}{4} + \frac{b^2}{4}$$

$$h = -\frac{a}{2} \quad k = -\frac{b}{2} \quad r^2 = \frac{a^2 + b^2 - 4c}{4}$$

$$\left(x - \underset{\uparrow}{2}\right)^2 + \left(y + \underset{\uparrow}{3}\right)^2 = 16$$

$$C = (2, -3)$$

$$r = 4$$



$$x^2 + y^2 - 6x + 10y + 3 = 0$$

$$\left(-\frac{b}{2}\right)^2$$

$$\left(\frac{a}{2}\right)^2$$

$$\underline{x^2 - 6x + 9} + \underline{y^2 + 10y + 25} = -3 + 9 + 25$$

$$(x-3)^2 + (y+5)^2 = 31$$

$$C = (3, -5)$$

$$r = \sqrt{31}$$

$$C = (3, -7) \quad r = 5$$

$$(x-3)^2 + (y+7)^2 = 5^2$$

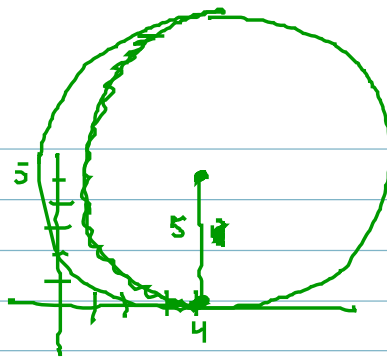
$$(x-3)^2 + (y+7)^2 = 25 \quad \leftarrow \text{standard}$$

$$x^2 - 6x + 9 + y^2 + 14y + 49 - 25 = 0$$

$$x^2 + y^2 - 6x + 14y + 33 = 0 \quad \leftarrow \text{General}$$

$C = (4, 5)$
tangent to x-axis

$$(x-4)^2 + (y-5)^2 = 25$$



$$(1, 4) \quad (-3, 2)$$

$$C = (\bar{x}, \bar{y}) = \left(\frac{1+(-3)}{2}, \frac{4+2}{2} \right) = \left(\frac{-2}{2}, \frac{6}{2} \right) = (-1, 3)$$

$$r = \sqrt{(1-(-3))^2 + (4-2)^2} = \sqrt{4^2 + 2^2} = \sqrt{16+4} = \sqrt{20} = \sqrt{4 \cdot 5} = 2\sqrt{5}$$

$$(x-(-1))^2 + (y-3)^2 = (2\sqrt{5})^2$$

$$(x+1)^2 + (y-3)^2 = 20 \leftarrow$$

~~$$(x-2)^2 + (y+3)^2 = 16 \quad x^2 + y^2$$~~

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

$$x^2 - 4x + 4 + y^2 + 6y + 9 - 16 = 0$$

$$x^2 + y^2 - 4x + 6y - 3 = 0$$

$$x^2 - 4x - 3 = 0$$

$$y^2 + 6y - 3 = 0$$

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(-3)}}{2(1)}$$

$$= \frac{4 \pm \sqrt{28}}{2}$$

$$= \frac{4 \pm 2\sqrt{7}}{2}$$

$$= 2 \pm \sqrt{7} \quad (2+\sqrt{7}, 0) \\ (2-\sqrt{7}, 0)$$

$$y = \frac{-6 \pm \sqrt{6^2 - 4(1)(-3)}}{2(1)}$$

$$y = \frac{-6 \pm \sqrt{48}}{2}$$

$$= \frac{-6 \pm 4\sqrt{3}}{2}$$

$$= -3 \pm 2\sqrt{3} \quad (0, -3+2\sqrt{3}) \\ (0, -3-2\sqrt{3})$$