

Name _____
Date _____

Trigonometry
Conics Review pt I – circles and ellipses

Factor Completely

$$x^2 - 10x + 21$$

$$(x-3)(x-7)$$

$$3x^2 - 12x - 36$$

$$3(x-6)(x+2)$$

$$y^4 + 11y^3 + 30y^2$$

$$y^2(y+5)(y+6)$$

$$27a^3 + b^3$$

$$(3a+b)(9a^2 - 3ab + b^2)$$

$$x^4 - 81$$

$$(x^2+9)(x+3)(x-3)$$

$$x(x+3) - 6(x+3)$$

$$(x-6)(x+3)$$

$$x^3 + 2x^2 - x - 2$$

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

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

Complete the square but do not solve.

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

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

$$(x-2)^2 = 2$$

$$x^2 + 6x - 13 = 0$$

$$x^2 + 6x + 9 = 13 + 9$$

$$(x+3)^2 = 22$$

$$2x^2 + 8x = 11$$

$$2(x^2 + 4x + 4) = 11 + 2(4)$$

$$2(x+2)^2 = 19$$

$$3x^2 + 12x - 4 = 0$$

$$3x^2 + 12x = 4$$

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

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

$$x^2 - 5x - 1 = 0$$

$$x^2 - 5x + \frac{25}{4} = 1 + \frac{25}{4}$$

$$(x - \frac{5}{2})^2 = \frac{29}{4}$$

$$2x^2 - 3x = 1$$

$$2(x^2 - \frac{3}{2}x + \frac{9}{16}) = 1 + 2(\frac{9}{16})$$

$$2(x - \frac{3}{4})^2 = \frac{17}{8}$$

Graph each circle. Then identify the center and the radius. ← See graph paper

① $x^2 + y^2 = 4$

④ $(x-2)^2 + y^2 = 9$

② $(x+1)^2 + (y+2)^2 = 1$

④ $x^2 + y^2 + 4x + 2y - 20 = 0$

⑤ $x^2 + y^2 - 6x + 2y + 9 = 0$

Write the equation of the circle:

Centered at $(2, -3)$ with a radius of 5. $(x-2)^2 + (y+3)^2 = 25$

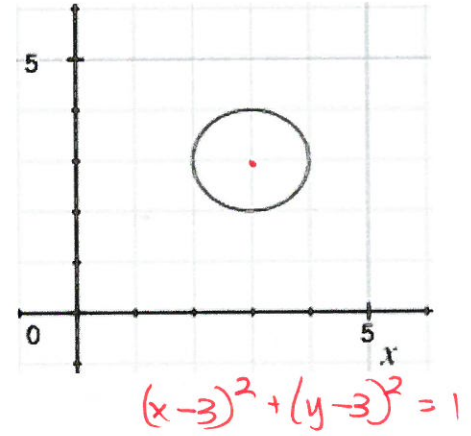
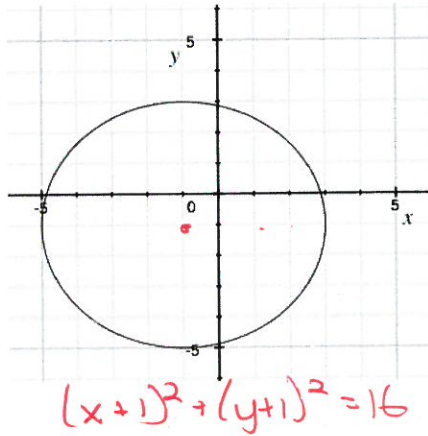
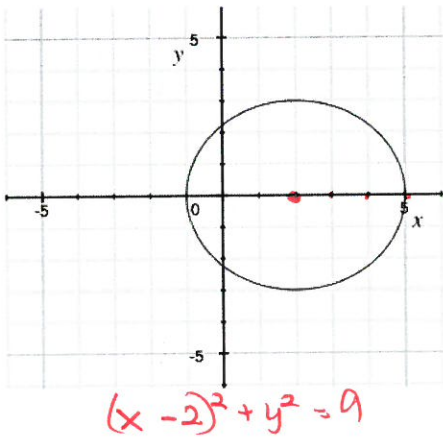
Centered at $(-1, -4)$ and through the point $(-2, -3)$. $(x+1)^2 + (y+4)^2 = 2$

Centered at $(2, 5)$ and through the x-axis. $(x-2)^2 + (y-5)^2 = 25$



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Write the equation of the circle:



Graph each of the following ellipses. Then identify the center, vertices, the co-vertices, and the foci.

6 $\frac{x^2}{1} + \frac{y^2}{25} = 1$

7 $\frac{y^2}{25} + \frac{x^2}{16} = 1$

8 $\frac{(x-2)^2}{9} + \frac{(y+1)^2}{4} = 1$

9 $9x^2 + 4y^2 = 136$

10 $x^2 + y^2 + 6y + 5 = 0$

11 $x^2 + 2y^2 + 4x - 8y + 2 = 0$

Write the equation of each ellipse:

Centered at (0,0) with a focus at (0,-4) and a vertex at (0,6)

$a = 6$ Major = y $c^2 = a^2 - b^2$
 $c = 4$ $16 = 36 - b^2$ $b^2 = 20$

$\frac{x^2}{20} + \frac{y^2}{36} = 1$

With foci of (-3,0) and (3,0) and a vertex at (4,0)

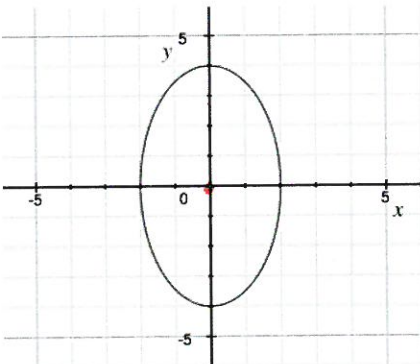
Center (0,0) $a = 4$ $c^2 = a^2 - b^2$
 $c = 3$ $9 = 16 - b^2$ $b^2 = 7$

$\frac{x^2}{16} + \frac{y^2}{7} = 1$

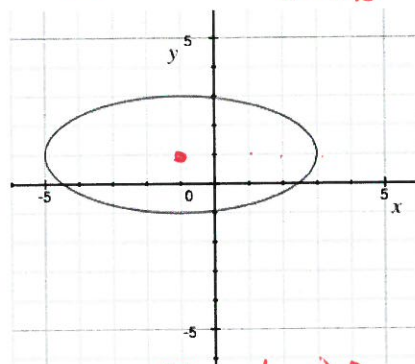
Centered at (-4,10) and with foci at (-4,2) and (-4,8)

Vertex center (-4,5) $a = 5$ $c^2 = a^2 - b^2$
 $c = 3$ $9 = 25 - b^2$ $b^2 = 16$

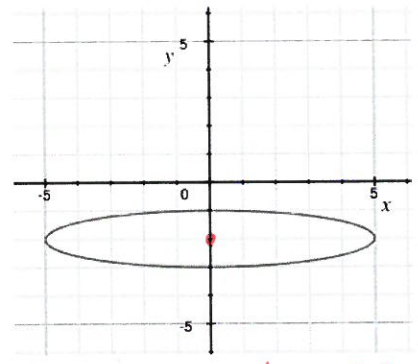
$\frac{(x+4)^2}{16} + \frac{(y-5)^2}{25} = 1$



$\frac{x^2}{4} + \frac{y^2}{16} = 1$



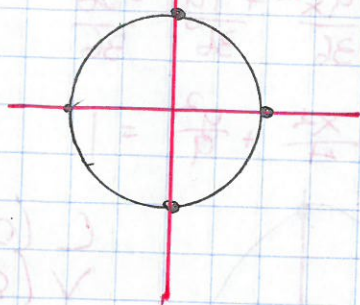
$\frac{(x+1)^2}{16} + \frac{(y-1)^2}{4} = 1$



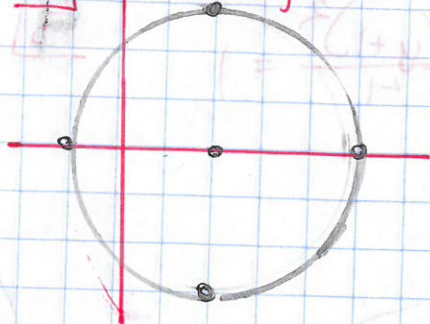
$\frac{x^2}{25} + \frac{(y+2)^2}{1} = 1$

Circles

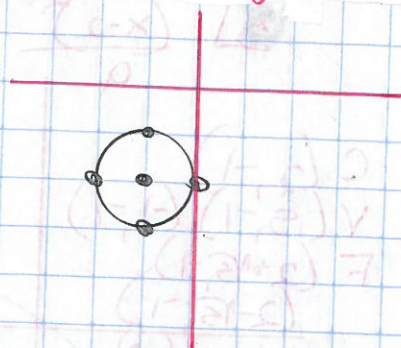
1) $x^2 + y^2 = 4$



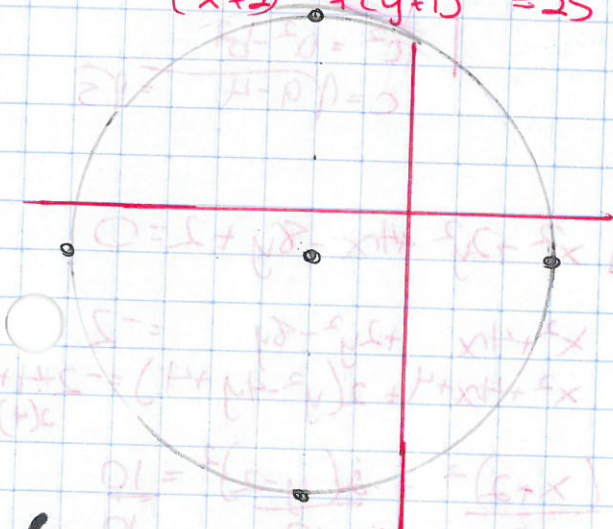
2) $(x-2)^2 + y^2 = 9$



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



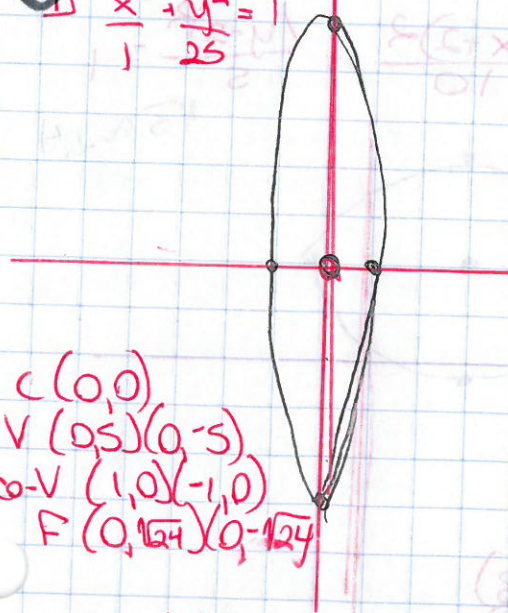
4) $x^2 + y^2 + 4x + 2y - 20 = 0$
 $x^2 + 4x + 4 + y^2 + 2y + 1 = 20 + 4 + 1$
 $(x+2)^2 + (y+1)^2 = 25$



5) $x^2 + y^2 - 6x + 2y + 9 = 0$
 $x^2 - 6x + 9 + y^2 = -2 + 9$
 $(x-3)^2 + y^2 = -2$

Not a circle!!

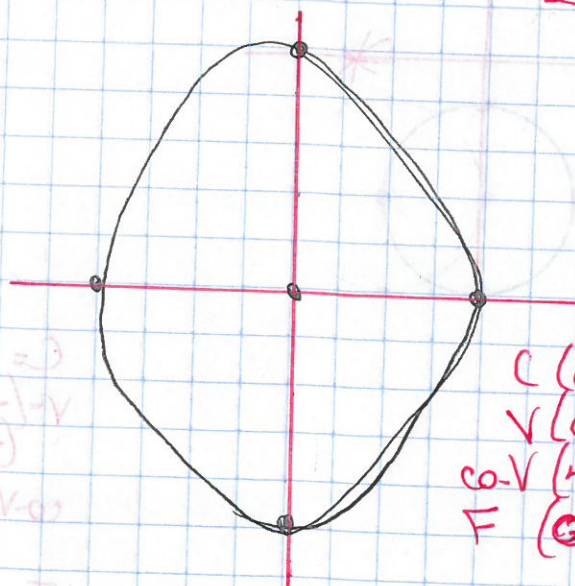
6) $\frac{x^2}{1} + \frac{y^2}{25} = 1$



C (0,0)
 V (0,5) (0,-5)
 co-V (1,0) (-1,0)
 F (0, sqrt(24)) (0, -sqrt(24))

$c^2 = a^2 - b^2$
 $c = \sqrt{25 - 1} = \sqrt{24}$

7) $\frac{y^2}{25} + \frac{x^2}{16} = 1$ $\frac{x^2}{16} + \frac{y^2}{25} = 1$



C (0,0)
 V (0,5) (0,-5)
 co-V (4,0) (-4,0)
 F (3,0) (-3,0)

$c^2 = 25 - 16 = 9$
 $c = 3$

$$8) \frac{(x-2)^2}{9} + \frac{(y+1)^2}{4} = 1$$

$$C(2, -1)$$

$$V(5, -1) (-1, -1)$$

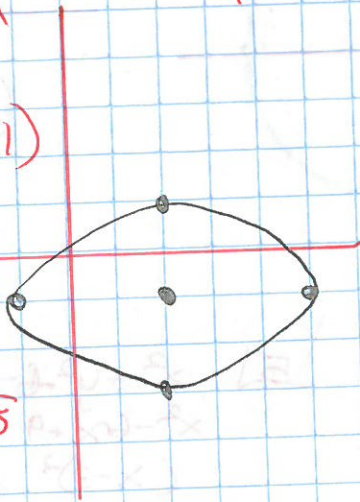
$$F(2+\sqrt{5}, -1)$$

$$(2-\sqrt{5}, -1)$$

$$co-V(2, 1) (2, 3)$$

$$c^2 = a^2 - b^2$$

$$c = \sqrt{9-4} = \sqrt{5}$$



$$9) \frac{9x^2}{36} + \frac{4y^2}{36} = \frac{36}{36}$$

$$\frac{x^2}{4} + \frac{y^2}{9} = 1$$

$$C(0, 0)$$

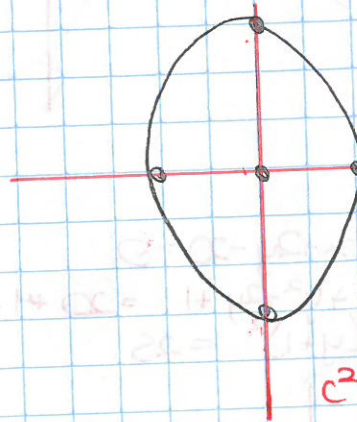
$$V(0, 3) (0, -3)$$

$$co-V(2, 0) (-2, 0)$$

$$F(0, \sqrt{5}) (0, -\sqrt{5})$$

$$c^2 = a^2 - b^2$$

$$c = \sqrt{9-4} = \sqrt{5}$$



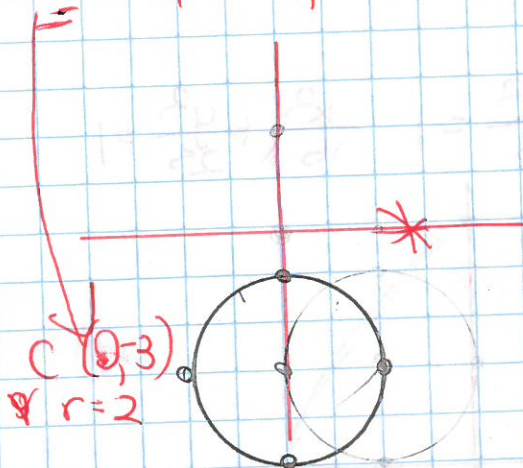
$$10) x^2 + y^2 + 6y + 5 = 0$$

$$x^2 + y^2 + 6y + 9 = -5 + 9$$

$$\frac{x^2}{4} + \frac{(y+3)^2}{4} = \frac{4}{4}$$

$$* \text{circle!}$$

$$\frac{x^2}{4} + \frac{(y+3)^2}{4} = 1$$



$$C(0, -3)$$

$$r = 2$$

$$11) x^2 + 2y^2 + 4x - 8y + 2 = 0$$

$$x^2 + 4x + 2y^2 - 8y = -2$$

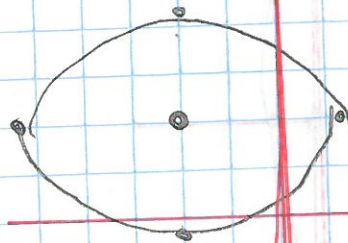
$$x^2 + 4x + 4 + 2(y^2 - 4y + 4) = -2 + 4 + 2(4)$$

$$\frac{(x+2)^2}{10} + \frac{2(y-2)^2}{10} = \frac{10}{10}$$

$$\frac{(x+2)^2}{10} + \frac{(y-2)^2}{5} = 1$$

$$\sqrt{10} \approx 3.3$$

$$\sqrt{5} \approx 2.4$$



$$C(-2, 2)$$

$$V(-2+\sqrt{10}, 2)$$

$$(-2-\sqrt{10}, 2)$$

$$co-V(-2, 2+\sqrt{5})$$

$$(-2, 2-\sqrt{5})$$

$$Foc.(-2+\sqrt{5}, 2)$$

$$(-2-\sqrt{5}, 2)$$

$$c^2 = a^2 - b^2$$

$$c = \sqrt{10-5} = \sqrt{5}$$