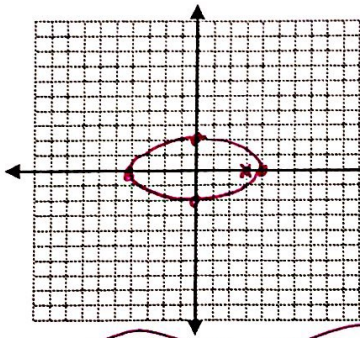


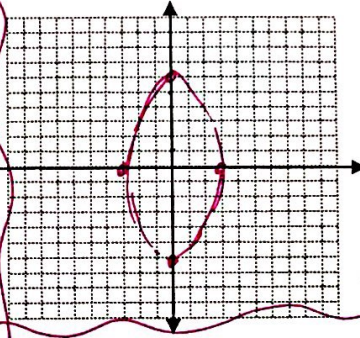
Graph the ellipse and identify the center, vertices, and foci.

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



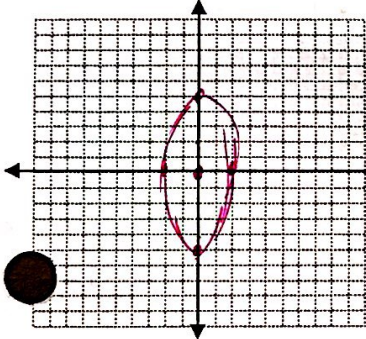
Center:  $(0,0)$   
Vert:  $(4,0) (-4,0)$   
CV:  $(0,2) (0,-2)$   
Foci:  $(\pm 2\sqrt{3}, 0)$

2.  $\frac{x^2}{9} + \frac{y^2}{36} = 1$



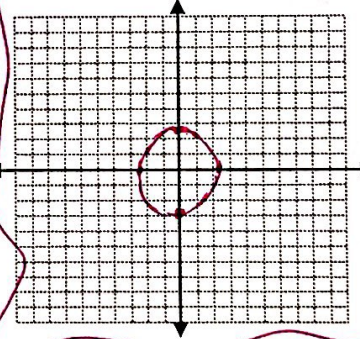
Center:  $(0,0)$   
Vert:  $(0,6) (0,-6)$   
CV:  $(-3,0) (3,0)$   
Foci:  $(0, \pm 3\sqrt{3})$

3.  $25x^2 + 4y^2 = 100 \Rightarrow \frac{x^2}{4} + \frac{y^2}{25} = 1$



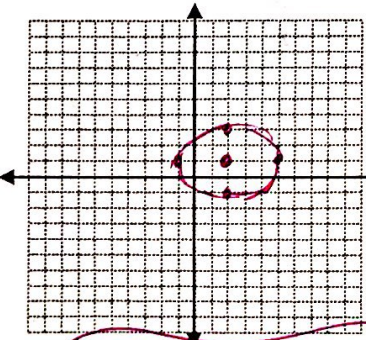
Center:  $(0,0)$   
Vert:  $(0,5) (0,-5)$   
CV:  $(-2,0) (2,0)$   
Foci:  $(0, \pm \sqrt{21})$

4.  $7x^2 = 35 - 5y^2 \Rightarrow \frac{x^2}{5} + \frac{y^2}{7} = 1$



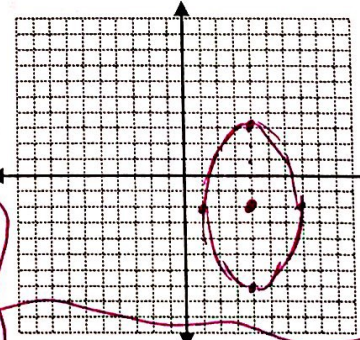
Center:  $(0,0)$   
Vert:  $(\sqrt{5},0) (-\sqrt{5},0)$   
CV:  $(0, \sqrt{7}) (0, -\sqrt{7})$   
Foci:  $(0, \pm \sqrt{2})$

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



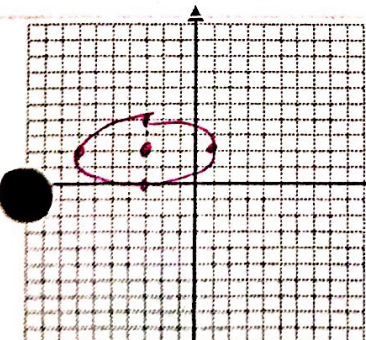
Center:  $(2,1)$   
Vert:  $(-1,1) (5,1)$   
CV:  $(2,-1) (2,3)$   
Foci:  $(2 \pm \sqrt{5}, 1)$

6.  $\frac{(x-4)^2}{9} + \frac{(y+2)^2}{25} = 1$



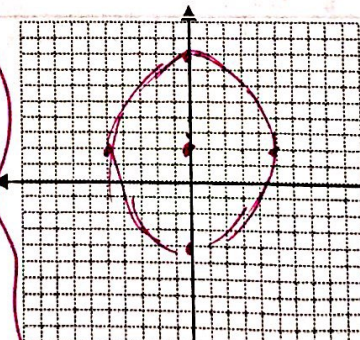
Center:  $(4,-2)$   
Vert:  $(4,3) (4,-7)$   
CV:  $(1,-2) (7,-2)$   
Foci:  $(4,-6) (4,2)$

7.  $(x+3)^2 + 4(y-2)^2 = 16 \Rightarrow \frac{(x+3)^2}{16} + \frac{(y-2)^2}{4} = 1$



Center:  $(-3,2)$   
Vert:  $(-7,2) (1,2)$   
CV:  $(-3,0) (-3,4)$   
Foci:  $(-3 \pm 2\sqrt{3}, 2)$

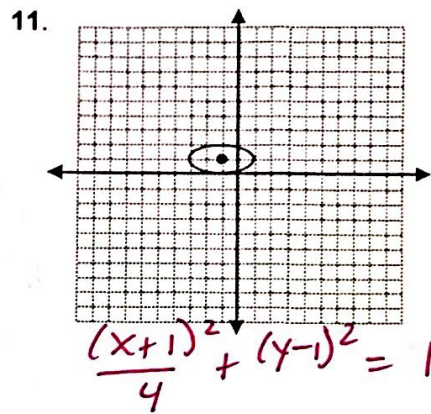
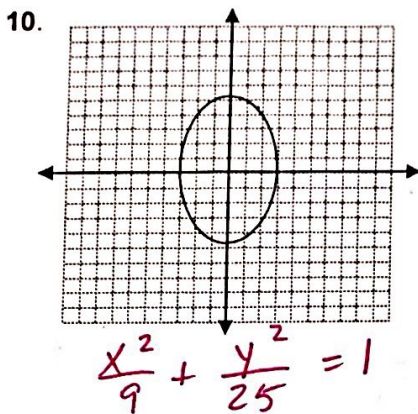
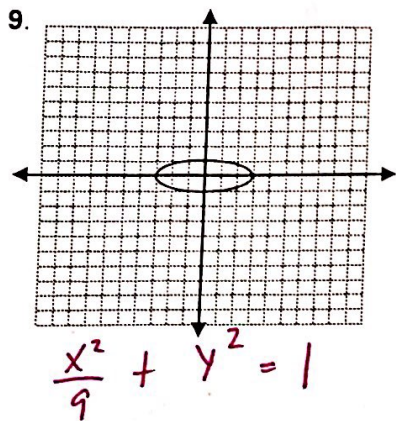
8.  $\frac{x^2}{25} + \frac{(y-2)^2}{36} = 1$



Center:  $(0,2)$   
Vert:  $(0,8) (0,-4)$   
CV:  $(-5,2) (5,2)$   
Foci:  $(0, 2 \pm \sqrt{11})$



Find the standard form of the equation of each ellipse.



Find the standard form of the equation of each ellipse satisfying the given conditions.

12. Foci:  $(\pm 5, 0)$ ; Vertices  $(\pm 8, 0)$

$$\frac{x^2}{64} + \frac{y^2}{39} = 1$$

13. Foci:  $(0, \pm 4)$ ; Vertices:  $(0, \pm 7)$

$$\frac{x^2}{33} + \frac{y^2}{49} = 1$$

14. Foci:  $(\pm 2, 0)$ ; y-intercepts:  $\pm 3$

$$\frac{x^2}{13} + \frac{y^2}{9} = 1$$

15. Major axis horizontal with length 8; length of minor axis 4; Center  $(0, 0)$

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

16. Major axis vertical with length 10; Length of minor axis 4; Center  $(-2, 3)$

$$\frac{(x+2)^2}{4} + \frac{(y-3)^2}{25} = 1$$

17. Endpoints of Major Axis:  $(7, 9)$  &  $(7, 3)$   
Endpoints of Minor Axis:  $(5, 6)$  &  $(9, 6)$

$$\frac{(x-7)^2}{4} + \frac{(y-6)^2}{9} = 1$$

Convert each equation to standard form by completing the square.

18.  $9x^2 + 25y^2 - 36x + 50y - 164 = 0$

$$\frac{(x-2)^2}{25} + \frac{(y+1)^2}{9} = 1$$

19.  $x^2 + 4y^2 + 10x - 8y + 13 = 0$

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

20.  $4x^2 + y^2 + 16x - 6y - 39 = 0$

$$\frac{(x+2)^2}{16} + \frac{(y-3)^2}{64} = 1$$

21.  $4x^2 + 25y^2 - 24x + 100y + 36 = 0$

$$\frac{(x-3)^2}{25} + \frac{(y+2)^2}{4} = 1$$