Review –Chapter 10

1. Find the center, foci and vertices of the following ellipses
   a) $3x^2+4y^2-36x + 32y+160 = 0$
   b) $\dfrac{(x+3)^2}{36} + \dfrac{(y+1)^2}{9} = 1$

2. Find the center, vertices, foci, transverse axis and the equations of asymptotes of given hyperbolas

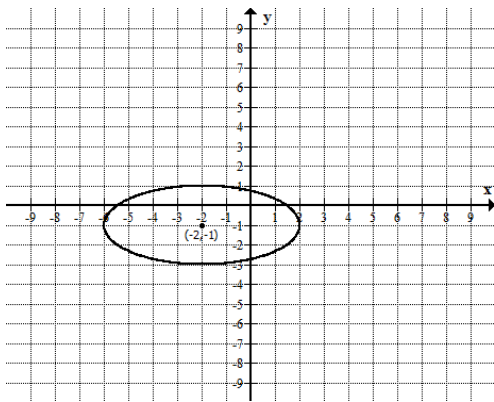   a) $x^2 - 4y^2 - 2x - 24y - 39 = 0$

   b) $9y^2 - 16 x^2 = 144$
   c) $\dfrac{(x+2)^2}{4} - \dfrac{(y-3)^2}{9} = 1$

3. Find the equation, in the standard form, of the hyperbola with vertices $(0,\pm 4)$ and asymptotes $y = \pm\dfrac{1}{2}x$

4. Find the equation, in the standard form, of the hyperbola with vertices $(\pm 5,0)$ and foci $(\pm 8, 0)$
5. Find the equation, in the standard form, of the hyperbola with center $(3,2)$, vertex at $(3,4)$ and focus at $(3,-3)$
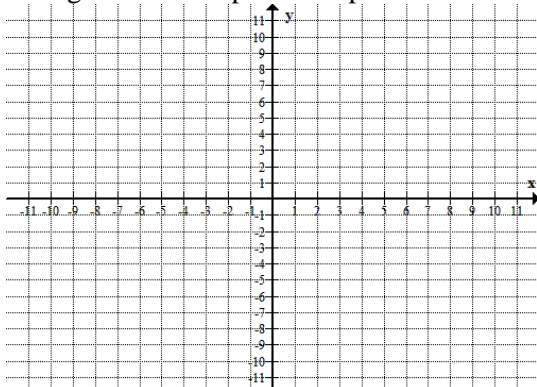6. Write the equation for the graph below
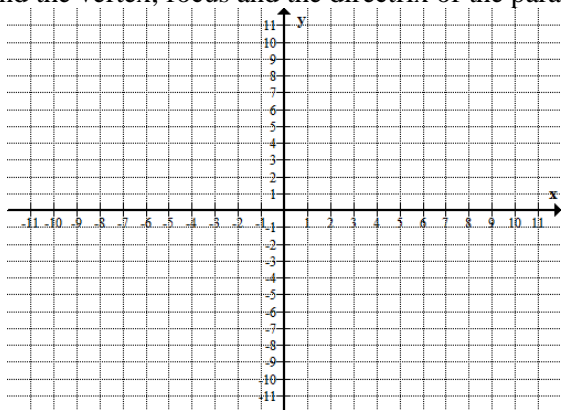

7. Find the asymptotes of the following hyperbolas
   a) $\dfrac{x^2}{16} - \dfrac{y^2}{4} = 1$
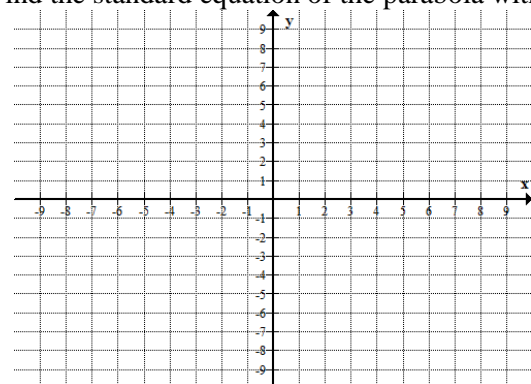   b) $\dfrac{(y-1)^2}{4} - \dfrac{(x+3)^2}{25} = 1$

8. Find the equation, in the standard form, of the ellipse with foci at $(4,0)$ and $(4,-6)$ whose major axis has the length of 10. Graph the ellipse.

9. Find the vertex, focus and the directrix of the parabola $y^2 = -12x$. Graph the parabola.
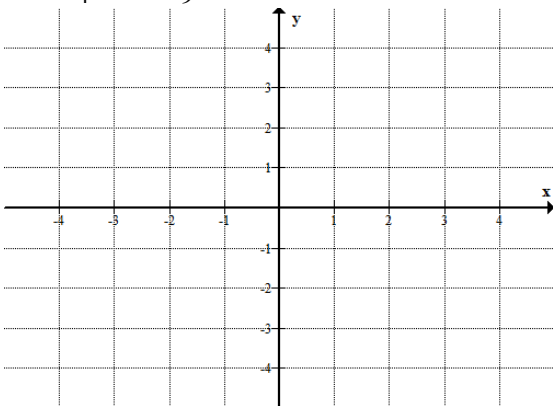
10. Find the standard equation of the parabola with vertex at (5,3) and focus at (2,3). Graph the parabola.
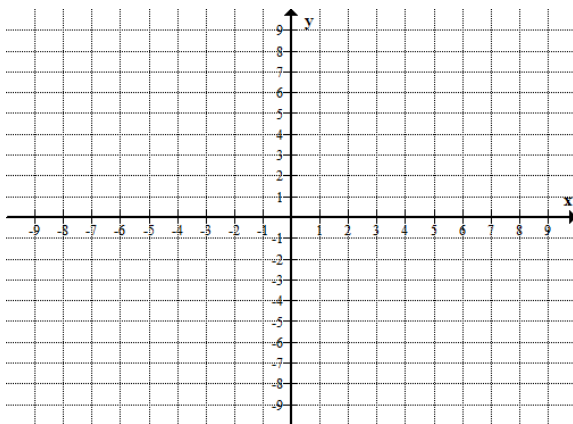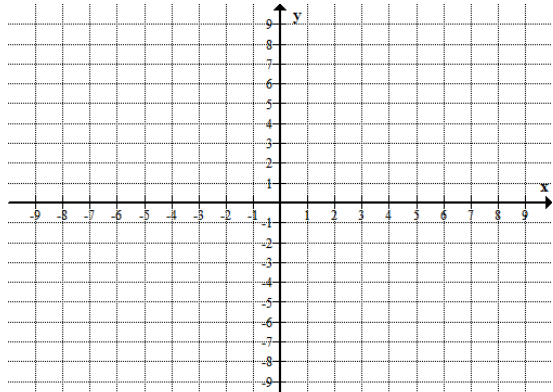
11. Graph the equation.

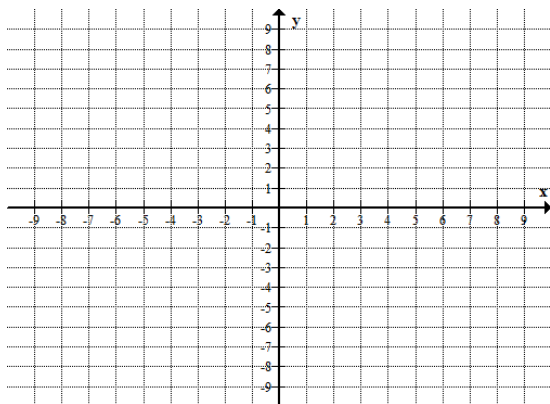$$\frac{(x+2)^2}{4} + \frac{(y+1)^2}{9} = 1$$

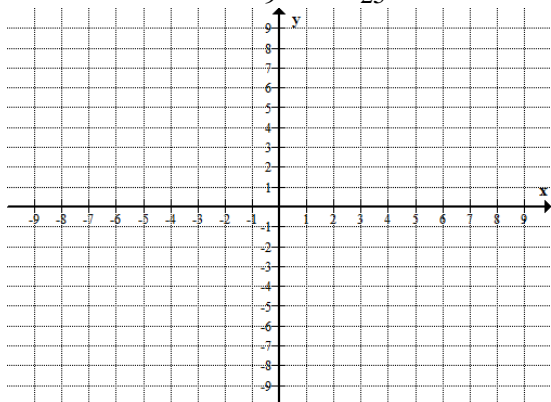12. Find the vertex, focus and the directrix of the parabola given by $y^2 - 8y - 8x = -40$. Graph the equation.

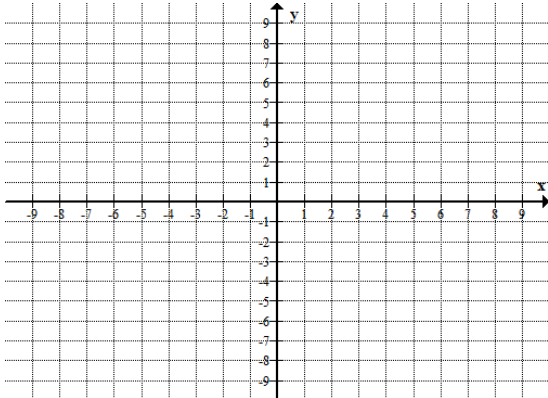13. Graph the equation $\dfrac{y^2}{9} - \dfrac{x^2}{4} = 1$

14. Graph the equation $4x^2 + 9y^2 = 36$ and find its foci.

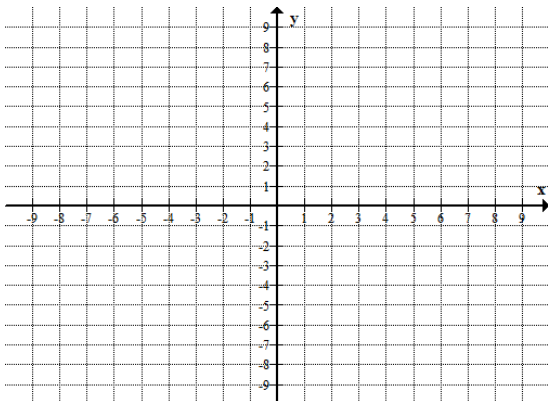15. Graph the equation $\dfrac{(x-1)^2}{9} - \dfrac{(y+1)^2}{25} = 1$

16. Graph the equation $36x^2 = 4y^2 + 144$

17. Find the equation in the standard form, of an ellipse with vertices at (4,3) and (4,9) and a focus at (4,8)

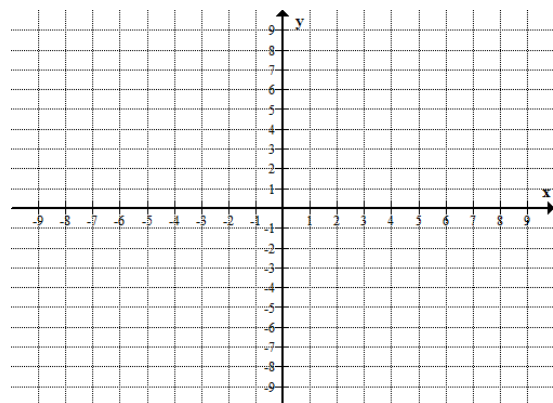18. Find the vertex, focus and the directrix of the parabola $(x-2)^2 = -8(y+3)$. Graph the parabola.

19. Find the standard equation of the parabola with vertex at (0,0),x-axis as the axis of symmetry and passing through the point (4,9)

20. Write the equation, in the standard form, of the hyperbola whose graph is given below.
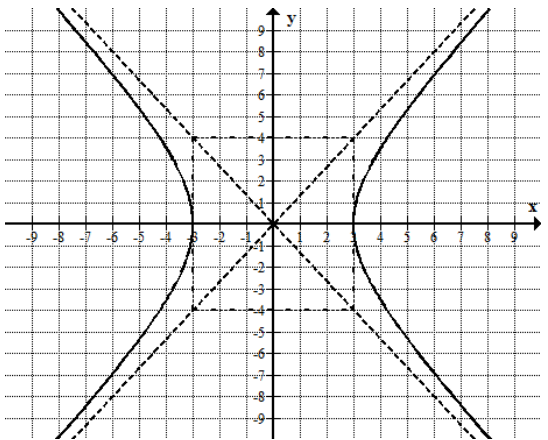
21. Graph the equation $x^2 = 6y$

22. Find the standard equation of the parabola with vertex at (6,-2) and focus at (6,-9).

23. Find the equation of the ellipse with center at (0,0), focus at (-5,0) and vertex at (8,0)

24. Write given equation in the standard form. Find its center, foci and vertices. Graph the equation.

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

25. Find the equation of the hyperbola with center at (0,0), focus at $(2\sqrt{5},0)$ and vertex at (4,0). Graph it.
26. Find the standard equation of the parabola with focus at (-4,0) and the directrix the line $x = 4$

27. Find the standard equation of the parabola with the focus at (0,3) and the directrix, the line $y = -3$.

Give the two points that define the latus rectum.

Answers:

1) a) center: (6,-4); foci: (5,-4),(6,-4); vertices (4,-4).(8,-4)
   b) center: (-3,-1); foci: $\left(-3-3\sqrt{3},-1\right)\left(-3+3\sqrt{3},-1\right)$; vertices (-9,-1),(3,-1)

2) a) center (1,-3); vertices: (-1,-3),(3,-3); foci: $\left(1-\sqrt{5},-3\right)\left(1+\sqrt{5},-3\right)$;transverse axis: $y = -3$; asymptotes:
   $$y = -\frac{1}{2}x - \frac{5}{2}, \ y = \frac{1}{2}x - \frac{7}{2}$$
b) center (0,0); vertices: (0,-4),(0,4); foci: $(0,-5),(0,5)$;transverse axis: $y = 0$; asymptotes: $y = \pm\frac{4}{3}x$

c) center (-2,3); vertices: (-4,3),(0,3); foci: $\left(-2-\sqrt{13},3\right)\left(-2+\sqrt{13},3\right)$;transverse axis: $y = 3$; asymptotes: $y = -\frac{3}{2}x, \ y = \frac{3}{2}x+6$
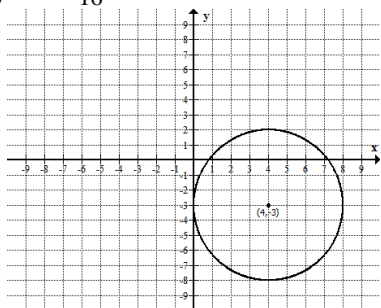
3) $\dfrac{y^2}{16} - \dfrac{x^2}{64} = 1$

4) $\dfrac{x^2}{25} - \dfrac{y^2}{39} = 1$
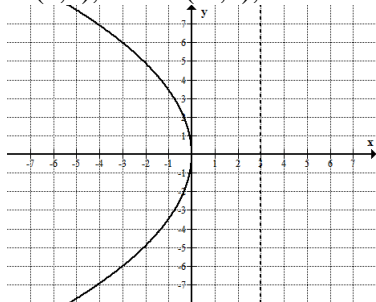
5) $\dfrac{(y-2)^2}{4} - \dfrac{(x-3)^2}{21} = 1$

6) $\dfrac{(x+2)^2}{16} + \dfrac{(y+1)^2}{4} = 1$

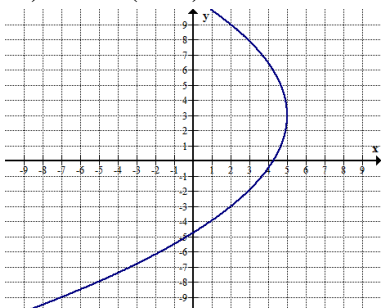7) a) $y = \pm\dfrac{1}{2}x$; b) $y = -\dfrac{2}{5}x - \dfrac{1}{5}$, $y = \dfrac{2}{5}x + \dfrac{11}{5}$

8) $\dfrac{(y+3)^2}{25} + \dfrac{(x-4)^2}{16} = 1$
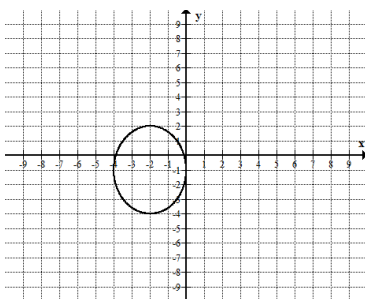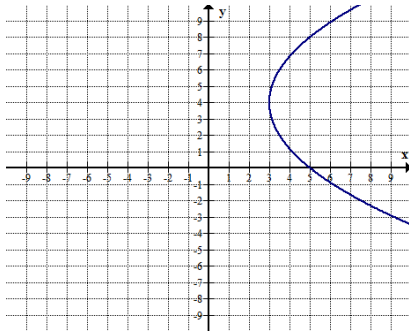

9) Vertex: (0,0); focus: (-3,0); directrix: x = 3

10) $(y - 3)^2 = -12 (x - 5)$

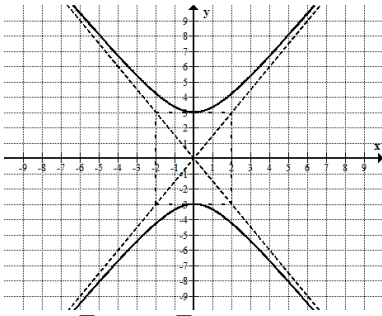11)
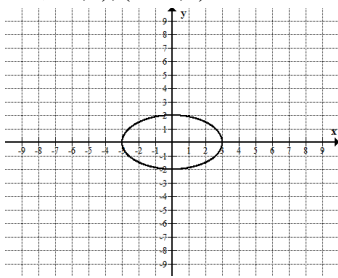
12) Vertex: (3,4); focus: (5,4); directrix: x = 1
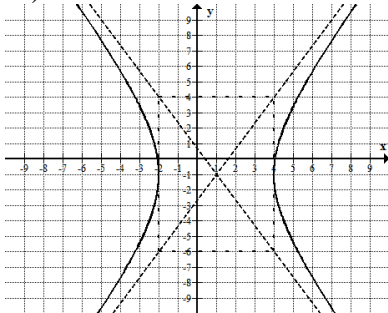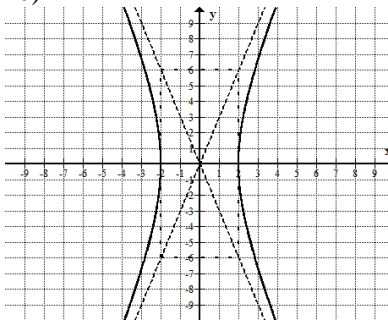

13)

14) foci $(\sqrt{5},0),(-\sqrt{5},0)$

15)

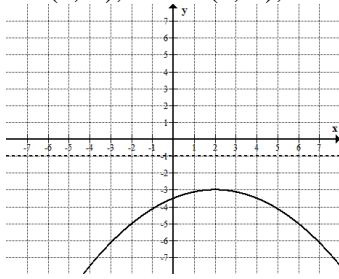16)

17) $\dfrac{(x-4)^2}{5}+\dfrac{(y-6)^2}{9}=1$
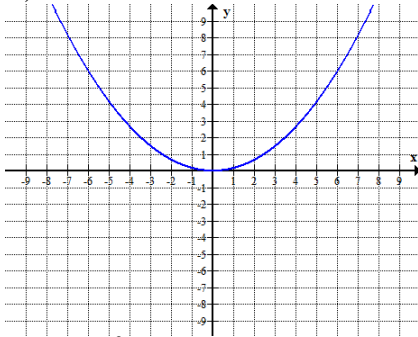
18) Vertex: (2,-3); focus: (2,-5); directrix: y = -1

19) $y^2 = \dfrac{81}{4}x$
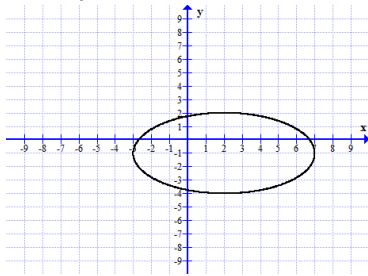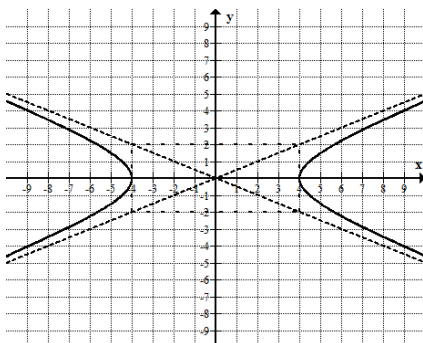
20) $\dfrac{x^2}{9} - \dfrac{y^2}{16} = 1$

21)

22) $(x - 6)^2 = -28(y + 2)$

23) $\dfrac{x^2}{64} + \dfrac{y^2}{39} = 1$

24) $\dfrac{(x-2)^2}{25} + \dfrac{(y+1)^2}{9} = 1$; center (2,-1); vertices: (-3,-1), (7,-1); foci: (-2,-1), (6,-1)

25) $\dfrac{x^2}{16} - \dfrac{y^2}{4} = 1$

26) $y^2 = -16x$

27) $x^2 = 12y$; (6,3),(-6,3)