Conic Section (Parabola)

1. Identify the vertex, axis of symmetry, focus, equation of directric for the following parabolas, the sketch the graph.
    a. $y-4=\frac{1}{16}(x-3)^2$
    b. $y^2-4y+2x-8=0$
2. Write the equation of a parabola with a vertex of (-2,4) and focus point (0,4)
3. Write the equation of a parabola with a focus at (-2,4) and a directrix of y=9
4. Write the equation and graph a parabola with focus (-2,-7) that opens to the right and passes through the point (6,-1)
5. The equation $\frac{1}{32}x^2$ models cross sections of parabolic mirrors that are used for solar energy. There is a heating tube located at the focus of each parabola. How high is this tube located above the vertex of its parabola?
6. A torchlight has a parabolic reflector. The parabolic "bowl" is 16 inches wide from rim to rim and 12 inches deep. The filament of the light bulb is located at the focus.
    a. What is the equation of the parabola used for the reflector?
    b. How far from the vertex is the filament of the light bulb?
7. The cables of the middle part of a suspension bridge are in the form of a parabola, and the towers supporting the cables are 600m apart and 100m high. What is the height of the cable at a point 150 feet from the center of the bridge?
8. Find the focus of the parabola $y^2-4y=4x$
9. Find the equation of the parabola with vertex (1,2), focus (1,3)
10. The axis of symmetry of a parabola is perpendicular to the y-axis. If the parabola passes though the three points (7,2), (1,0) and (7,-6), find the equation of the parabola and the coordinates of its focus.
11. Find the coordinates of the focus of the parabola $y=2x^2-4x+3$
12. A line with angle of inclination $\frac{\pi}{3}$ passes through the focus F of the parabola $y^2=6x$ and intersects with the parabola at point A and B. Find |AB|.
13. Find the coordinates of its vertex for parabola $(y-1)(y-3)=x-2$
14. Find the range of function $y=-2x^2+6x-9$
15. Find the coordinates of the focus and the equation of the directrix of the parabola $y=x^2+4x$. Hence, sketch the graph.
16. Given two points A and B on the parabola $y^2=4x$, if ΔOAB is an equilateral triangle, where O is the origin, find the area of ΔOAB