Conics Application Worksheet Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A satellite dish is shaped like a paraboloid of revolution. The signals that emanate from the satellite strike the surface of the dish and are reflected to a single point, where the receiver is located. If the dish is 10 feet across at its opening and is 4 feet deep at its center, at what position should the receiver be placed?
2. A cable TV receiving dish is in the shape of a paraboliod of revolution. Find the location of the receiver, which is located at the focus, if the dish is 6 feet across at its opening and 2 feet deep.
3. The reflector of a flashlight is in the shape of a paraboliod of revolution. Its diameter is 4 inches and its depth is 1 inch. How far from the vertex should the light bulb be placed so that the rays will be reflected parallel to the x-axis.
4. A sealed-beam headlight is in the shape of a paraboliod of revolution. The bulb, which is placed at the focus, is 1 inch from the vertex. If the depth is to be 2 inches, what is the diameter of the headlight at its opening?
5. The cables of a suspension bridge are in the shaped of a parabola. The towers supporting the cable are 600 feet apart and 80 feet high. If the cables touch the road surface midway between the towers, what it the height of the cable at a point 150 feet from the center of the bridge?
6. The cables of a suspension bridge are in the shape of a parabola. The towers supporting the cable are 400 feet apart and 100 feet high. If the cables are at a height of 10 feet midway between the towers, what is the height of the cable at a point 50 feet from the center of the bridge?
7. A searchlight is shaped like a paraboliod of revolution. If the light source is located 2 feet from the base along the axis of symmetry and the opening is 5 feet across, how deep should the searchlight be?
8. An arch is in the shape of the upper half of an ellipse is used to support a bridge that is to span a river 20 meters wide. The center of the arch is 6 meters above the center of the river. Write an equation for the ellipse in which the x-axis coincides with the water level and the y-axis passes through the center of the arch.
9. Jim standing at one focus of a whispering gallery is 6 feet from the nearest wall. His friend is standing at the other focus 100 feet away. What is the length of the whispering gallery? How high is its elliptical ceiling at the center?
10. A bridge is built in the shape of a semielliptical arch. The bridge has a span of 120 feet and a maximum height of 25 feet. Choose a suitable rectangular coordinate system and find the height of the arch at distances of 10, 30, and 50 feet from the center.
11. A bridge is built in the shape of a semielliptical arch and is to have a span of 100 feet. The height of the arch, at a distance of 40 feet from the center is to be 10 feet. Find the height of the arch at its center.

Find the equation of the conic described.

1. Focus at (-2, 0): directrix x = 2

1. Vertex at (4, -2): focus at (6, -2)
2. Focus at (-3, 4): directrix y = 2
3. Center at (2, -2): vertex at (7, -2): focus at (4, -2)
4. Foci at (5, 1) and (-1, 1); length of the major axis is 8
5. Center at (-3, -4); focus at (-3, -8); vertex at (-3, -2)
6. Foci at (3. 7) and (7, 7); vertex at (6, 7)
7. Vertices at (-1, -1) and (3, -1); asymptote of y + 1 = 3/2(x – 1)

## Identify the equation of the following and graph by hand. You may not need every space provided. Put your equation in standard form in the box.

## If it is a *parabola*, state the vertex, focus and directrix.

If it is an *ellipse*, state the center, vertices and foci.

If it is a hyperbola, state the center, vertices, foci and asymptotes

1. $\left(y-2\right)^{2}=8\left(1+1\right)$
2. $x^{2}+6x-4y+1=0$
3. $\frac{\left(x-3\right)^{2}}{4}+\frac{\left(y+1\right)^{2}}{9}=1$
4. $9x^{2}+4y^{2}-18x+16y-11=0$
5. $\left(y-3\right)^{2}-\left(x+2\right)^{2}=4$
6. $4x^{2}-y^{2}-24x-4y+16=0$

Problems are from Prentice Hall Precalculus Graphing and Data Analysis Sullivan and Sullivan 1998.