Conic Sections Worksheet NAME:

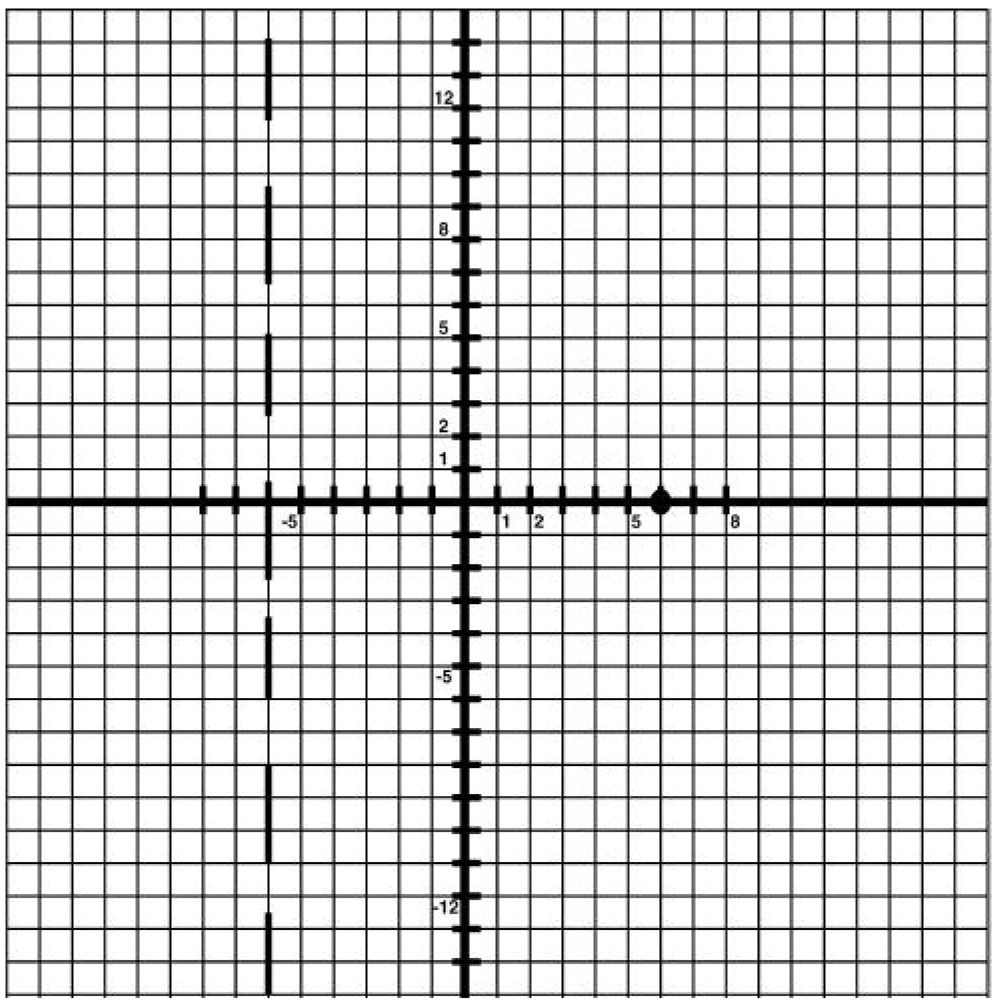
You will need a ruler to measure distances as well as to use as a straight edge.

Parabola:

1. Use your grapher to graph $y^2 = 4 * 6x$. Solved for y, this becomes $y = \pm\sqrt{24x}$. Remember this is graphed as $y_1 = +\sqrt{24x}$ and $y_2 = -\sqrt{24x}$.

2. Use the **Zoom Decimal** setting under the **Zoom** menu. This forces the x values into multiples of .1. Then change the **Range** (or **Window**) settings to **ymin** of –10 and **ymax** of 10.

3. Use **Trace** to estimate the y values for x = 2,4,6. Copy the graph accurately onto the graph below by plotting all the points for x = 2,4,6. Draw in the curve.



4. Use **Trace** to find the y values in the first column of the table below. Use just the positive y values.

5. With a straight edge, draw the perpendicular distances from these points on the parabola to the line x = -6. Also with a straight edge, draw the distances from these points to the point (6,0) which is marked on the x-axis. Measure and record the distances in the table.

Point (x,y)	Perpendicular Distance to Dashed Line x = -6	Distance to Point (6,0)
(2,)		
(4,)		
(6,)		
Pick your own! (,)		

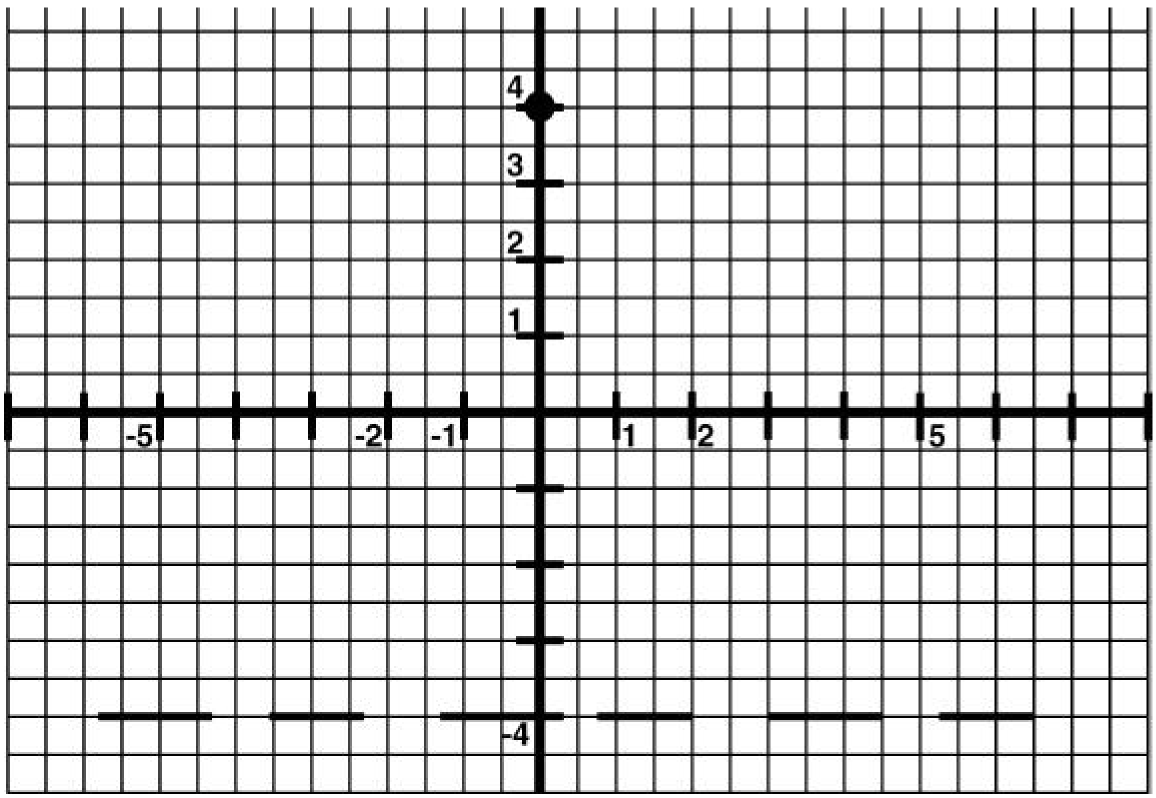
6. What do you notice? What would you hypothesize for any point on the parabola?

7. Pick another point on your graph. Determine the distance to the dashed line and the distance to the point (6,0) for your new point. Does your hypothesis fit?

Another Parabola:

1. Use your grapher to graph $x^2 = 4*4*y$. Solved for y, this becomes $y = \frac{x^2}{16}$.
2. Use the **Zoom Decimal** setting under the **Zoom** menu. This forces the x values into multiples of .1.

3. Use **Trace** to estimate the y values for x = -4,-2,3. Copy the graph accurately onto the graph below by plotting all the points for x = -4,-2,3. Draw in the curve.



4. Use **Trace** to find the y values in the first column of the table below.

5. With a straight edge, draw the perpendicular distances from these points on the parabola to the line y = -4. Also with a straight edge, draw the distances from these points to the point (0,4) which is marked on the y-axis. Measure and record the distances in the table.

Point (x,y)	Perpendicular Distance to Dashed Line y = -4	Distance to Point (0,4)
(-4,)		
(-2,)		
(3,)		
Pick your own! (,)		

6. What do you notice? What would you hypothesize for any point on the parabola?

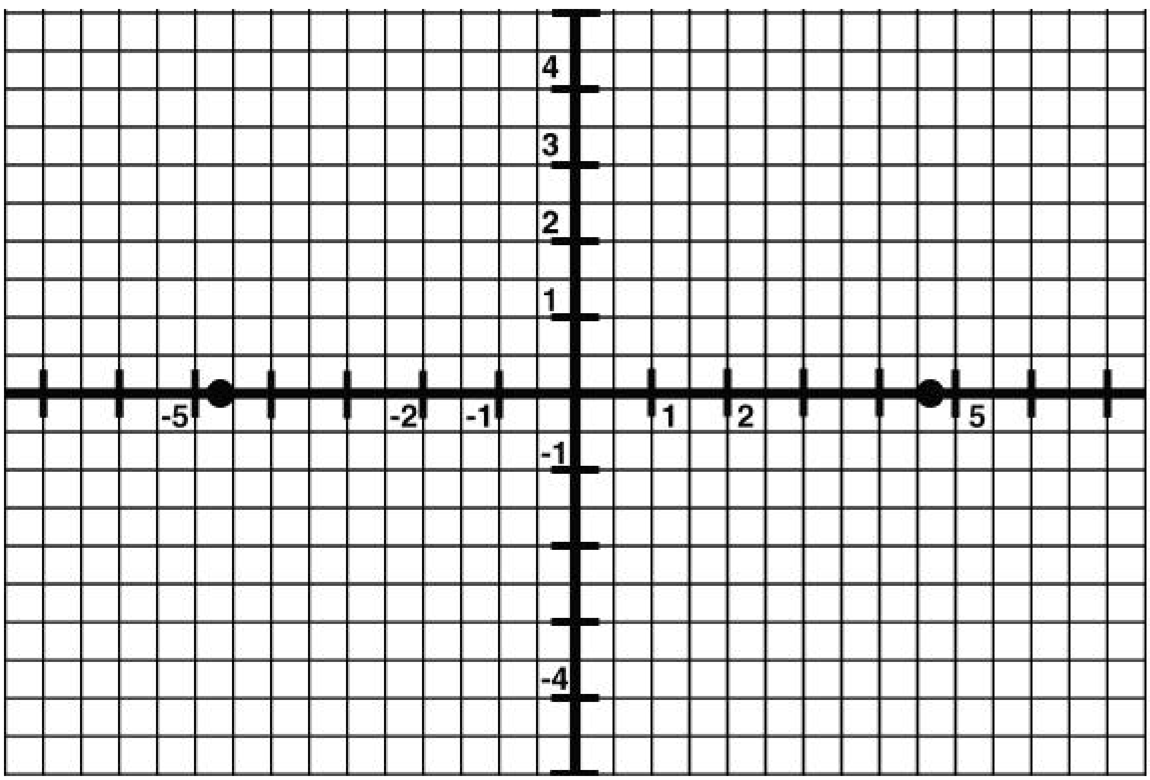
7. Pick another point on your graph. Determine the distance to the dashed line and the distance to the point (0,4) for your new point. Does your hypothesis fit?

Ellipse:

1. Use your grapher to graph $\frac{y^2}{25}+\frac{x^2}{4}=1$. Solved for y, this becomes $y=\pm\sqrt{4-\frac{4x^2}{25}}$. Remember this is graphed as $y_1=\sqrt{4-\frac{4x^2}{25}}$ and $y_2=-\sqrt{4-\frac{4x^2}{25}}$.

2. Use the **Zoom Decimal** setting under the **Zoom** menu. This forces the x values into multiples of .1.

3. Use **Trace** to estimate the y values for x = -3,0,2. Copy the graph accurately onto the graph below by plotting all the points for x = -3,0,2. Draw in the curve.



4. Use **Trace** to find the y values in the first column of the table below. Use just the positive y values.

5. Draw in the distances from each point to (4.58,0) and from each point to (-4.58,0), both marked on the x-axis. Measure these distances with your ruler. For each point, sum these distances. Use the table to record.

Point (x,y)	Distance from Point (4.58,0)	Distance from Point (-4.58,0)	Sum of Two Previous Columns
(-3,)			
(0,)			
(2,)			
Pick your own! (,)			

6. What do you notice? What would you hypothesize for any point on the parabola?

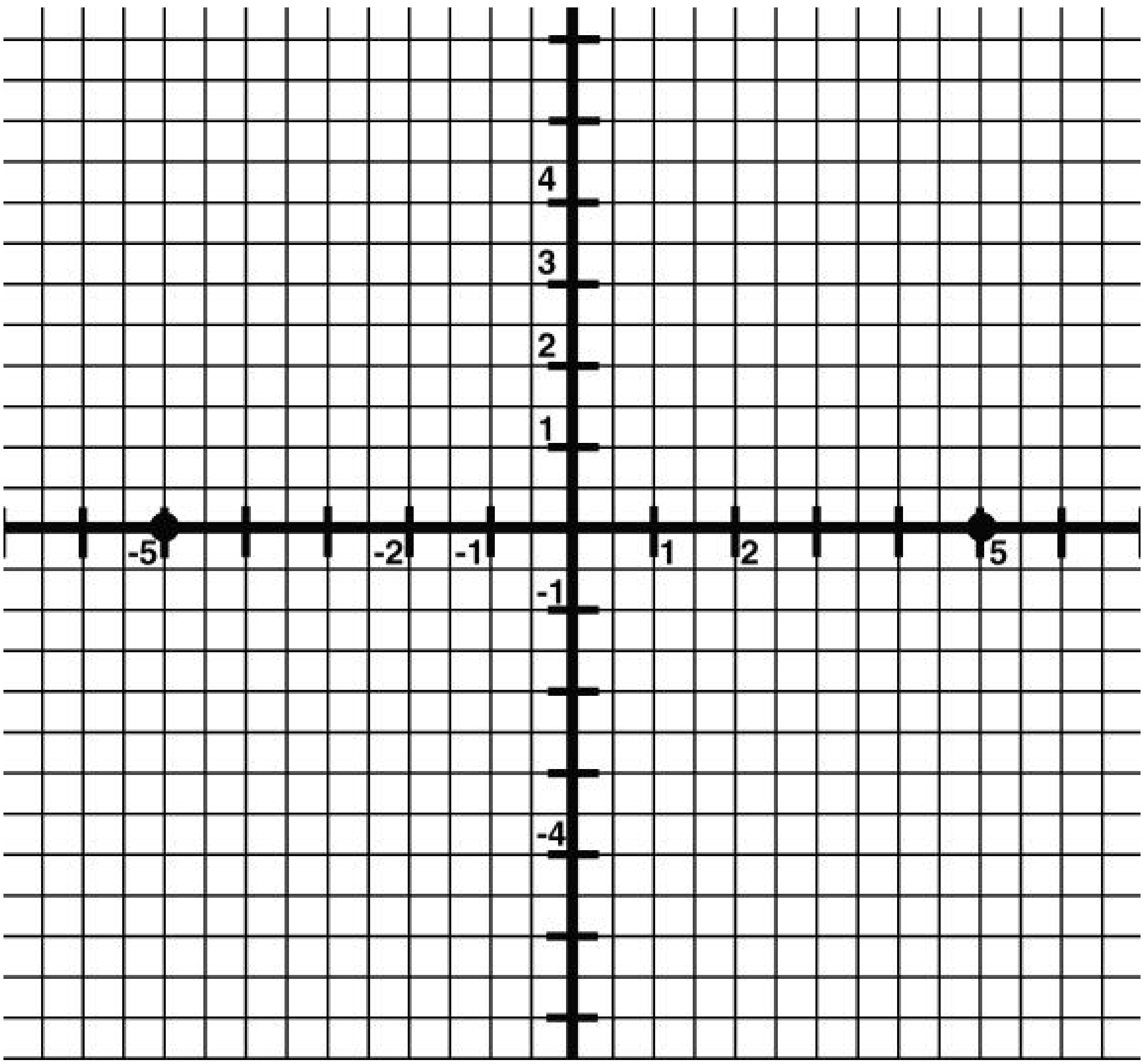
7. Pick another point on your graph. Determine the distances from this point to (4.58,0) and to (-4.58,0). Does your hypothesis fit?

Hyperbola:

1. Use your grapher to graph $\frac{x^2}{9} - \frac{y^2}{16} = 1$. Solved for y, this becomes $y = \pm\sqrt{\frac{16x^2 - 144}{9}}$. Remember this is graphed as $y_1 = \sqrt{\frac{16x^2 - 144}{9}}$ and $y_2 = -\sqrt{\frac{16x^2 - 144}{9}}$.

2. Use the **Zoom Decimal** setting under the **Zoom** menu. This forces the x values into multiples of .1. Then change the **Range** (or **Window**) settings to **ymin** of –7 and **ymax** of 7.

3. Use **Trace** to estimate the y values for x = -5,4,6. Copy the graph accurately onto the graph below by plotting all the points for x = -5,4,6. Draw in the curve.



4. Use **Trace** to find the y values in the first column of the table below. Use just the positive y values.

5. Draw in the distances from each point to (5,0) and from each point to (-5,0), both marked on the x-axis. Measure these distances with your ruler. For each point, find the absolute value of the difference of these distances. Use the table to record.

Point (x,y)	Distance from Point (5,0)	Distance from Point (-5,0)	Absolute Value of Difference of Two Previous Columns
(-5,)			
(4,)			
(6,)			
Pick your own! (,)			

6. What do you notice? What would you hypothesize for any point on the parabola?

7. Pick another point on your graph. Determine the distances from this point to (5,0) and to (-5,0). Does your hypothesis fit?