Name: Solutions Date: Period: ID: 1

Unit 11 Review – Conic Sections

1. Find the distance between $(-6,-3)$ and $(-3,3)$. Round your answer to 3 decimals.

$d=\sqrt{(-6+3)^2+(-3-3)^2}$

$d=\sqrt{45}$

$d\approx 6.708$

2. Find the midpoint between $(-5,1)$ and $(3,-8)$.

$M\left(\frac{-5+3}{2}, \frac{1-8}{2}\right)$

$M\left(-1, -\frac{7}{2}\right)$

3. Find the equation of the perpendicular bisector between $(1,5)$ and $(-5,3)$.

$M\left(\frac{1-5}{2}, \frac{3+5}{2}\right)$

$M(-2, 4)$

$m=\frac{5-3}{1+5}=\frac{2}{6}=\frac{1}{3} \rightarrow -3$

$y-4=-3(x+2)$

$y-4=-3x-6$

$y=-3x-2$

4. Sketch the graph of $(y+1)^2=-8(x-4)$ and identify the given information.

$4p=-8$

$p=-2$

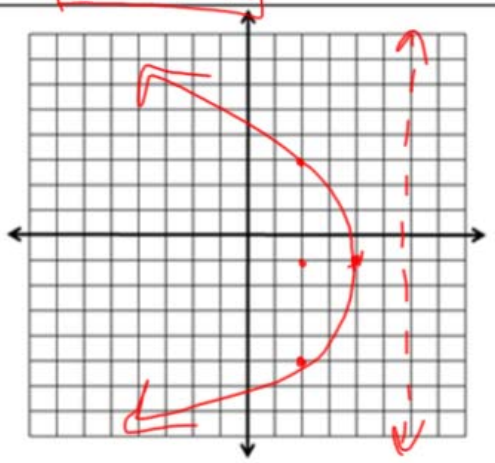
Coordinate of vertex: $(4,-1)$

Direction it opens: Left

Axis of symmetry: $y=-1$

Coordinate of focus: $(2,-1)$

Equation of directrix: $x=6$



5. Find an equation for the parabola that has a ***focus*** at $(-2,3)$ and a directrix at $x=2$.

Vertex: $(0,3)$

$p=-2$

$(y-3)^2=-8x$

6. $(2,-3)$ is a point on a circle whose center is at the origin. Write an equation of the line tangent to the circle at the given point.

$m=\frac{-3}{2}$

$y+3=\frac{2}{3}(x-2)$

$y+3=\frac{2}{3}x-\frac{4}{3}$

$y=\frac{2}{3}x-\frac{13}{3}$

7. Write an equation for a circle whose center is at $(-8,2)$ and has a radius of 8.

$(x+8)^2+(y-2)^2=64$

8. Sketch the graph of $9(x+3)^2+4(y-2)^2=36$ and identify the coordinate points for each of the following.

$\frac{(x+3)^2}{4}+\frac{(y-2)^2}{9}=1$

Center: $(-3,2)$

Vertices: $(-3,-1)$ $(-3,5)$

Co-vertices: $(-5,2)$ $(-1,2)$

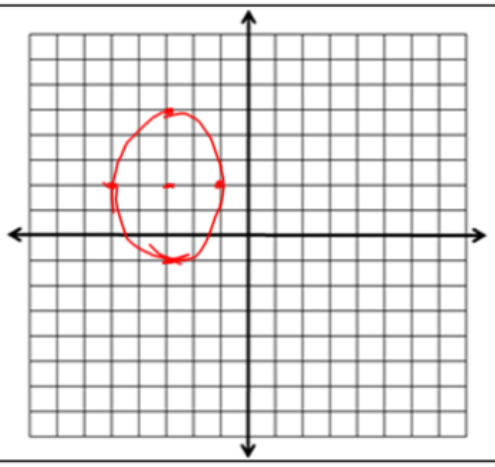
Foci: $(-3, 2\pm\sqrt{5})$

$a=3$

$b=2$

$c^2=9-4$

$c=\sqrt{5}$



9. Write an equation for a circle whose center is at $(-3,-15)$ and one point on the circle is $(-6,-16)$.

$(-6+3)^2+(-16+15)^2=r^2$

$9+1=r^2$

$10=r^2$

$$(x+3)^2+(y+15)^2=10$$

10. Write an equation for an ellipse given the following.
Vertices: $(9,4)$, $(-1,4)$
Foci: $(7,4)$, $(1,4)$

center: $(4,4)$

$a=5$

$c=3$

$9=25-b^2$

$16=b^2$

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

11. Write an equation for a hyperbola given the following.
Vertices: $(1,5)$, $(-19,5)$
Endpoints of Conjugate Axis: $(-9,11)$, $(-9,-1)$

b

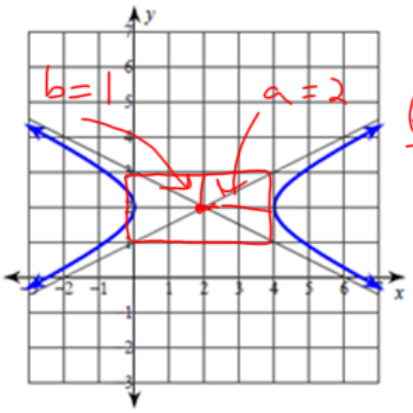
center: $(-9,5)$

$a=10$

$b=6$

$$\frac{(x+9)^2}{100}-\frac{(y-5)^2}{36}=1$$

12. Write an equation of the hyperbola.



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

13. Rewrite into conic section standard form and classify the conic.

$$9x^2-25y^2-50y-250=0$$

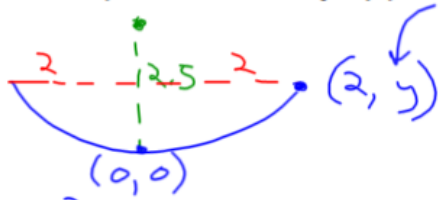
$9x^2-25(y^2+2y+1)=250$ -25

$\frac{9x^2}{225}-\frac{25(y+1)^2}{225}=\frac{225}{225}$

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

hyperbola

14. The cross section of a solar oven is a parabola. The heating point is located at the focus, 2.5 feet above the vertex and the oven is 4 feet across. Assume the vertex is at the origin. How deep is the oven? (*Hint: write an equation and solve for y.*)



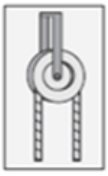
$x^2=4(2.5)y$

$2^2=10y$

$\frac{4}{10}=y$

0.4 ft deep

15. The center cross section of a rope pulley forms a hyperbolic shape for the outline of the concaved groove. The horizontal transverse axis of the hyperbolic outline has a distance of 8 centimeters from vertex to vertex and the foci are $2\sqrt{6}$ centimeters from the center. Write an equation that models the concaved groove.



$a=4$

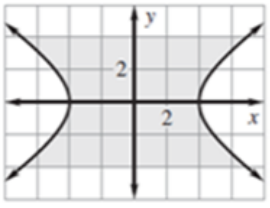
$c=2\sqrt{6}$

$c^2=a^2+b^2$

$(2\sqrt{6})^2=16+b^2$

$4\cdot 6=16+b^2$

$8=b^2$



$$\frac{x^2}{16}-\frac{y^2}{8}=1$$