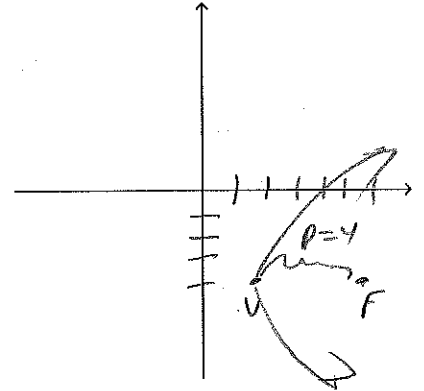#1. Find the equation of the parabola with focus (6, -4) and vertex (2, -4)

$$(y-k)^2 = 4p(x-h)$$
$$(y+4)^2 = 4(4)(x-2)$$
$$\boxed{(y+4)^2 = 16(x-2)}$$

#2. Graph the equation (label important features): $\dfrac{(y-1)^2}{9} - \dfrac{(x+2)^2}{4} = 1$

hyperbola

Center: $(-2, 1)$

Vertices: $(-2, 4) (-2, -2)$

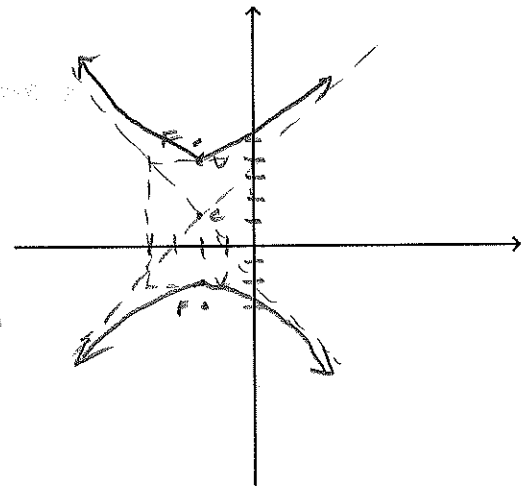Foci: $(-2, 1+\sqrt{13}) (-2, 1-\sqrt{13})$

Asymptotes: _____

$a^2 = 9, a = 3$
$b^2 = 4, b = 2$
$c^2 = a^2 + b^2$
$c^2 = 9 + 4 = 13$
$c = \sqrt{13} \ (\approx 3.6)$

#3. Find an equation of the ellipse with major axis 10 units long and foci at (1, 0) and (1, -6)
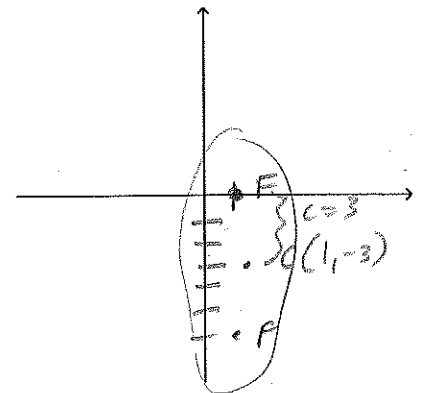
$a = 5$

$c = 3$
$c^2 = a^2 - b^2$
$9 = 25 - b^2$
$b^2 = 25 - 9$
$b^2 = 16$

$$\dfrac{(x-h)^2}{b^2} + \dfrac{(y-k)^2}{a^2} = 1$$

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

#4. Graph the equation (label important features): $\dfrac{(x+2)^2}{49}+\dfrac{(y-1)^2}{4}=1$

ellipse

Center: $(-2, 1)$

Vertices: $(5, 1)\ (-9, 1)$

Foci: $(-2+\sqrt{45}, 1)\ (-2-\sqrt{45}, 1)$

Eccentricity: $\dfrac{\sqrt{45}}{7}$

$a^2=49,\ a=7$

$b^2=4,\ b=2$

$c^2=a^2-b^2$

$c^2=49-4=45$

$c=\sqrt{45}\ (\approx 6.7)$

#5. Put the equation in standard form. $8x=y^2-4y-4$

$y^2-4y=8x+4$

$(y^2-4y+4)=8x+4+4$

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

$\boxed{(y-2)^2=8(x+1)}$ (parabola)

Tell which conic is represented by the equation.

#6. $6x^2+6y^2-3x-5y+3=0$ Hyperbola

#7. $-2x^2+3x+4y-10=0$ Parabola

#8. $-4x^2+6y^2-3x+2y-4=0$ Hyperbola

#9. $2x^2-3x-2y-12=0$ Parabola

#10. $8x^2+8y^2+2y-6=0$ Circle

#11. $12x^2+7y^2+3x+4y+6=0$ Ellipse

#12. Put the equation in standard form. $x^2+25y^2-6x+100y+84=0$

$x^2-6x+25y^2+100y=-84$

$(x^2-6x+9)+25(y^2+4y+4)=-84+9+100$

$(x-3)^2+25(y+2)^2=25$

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

$\boxed{\dfrac{(x-3)^2}{25}+\dfrac{(y+2)^2}{25}=1}$ (Ellipse)

#13. Graph the equation (label important features)

$(x+3)^2 = 8(y-1)$ parabola

Vertex: $(-3, 1)$
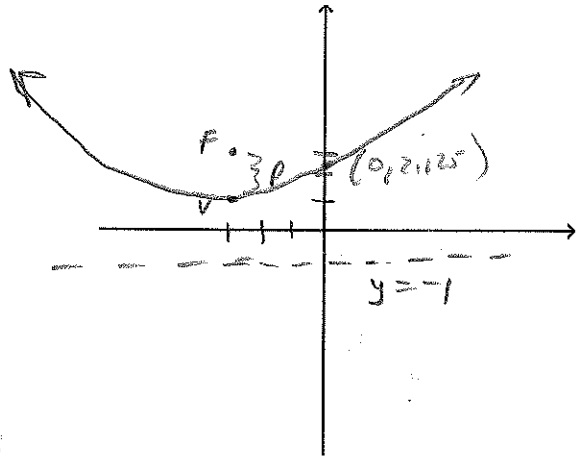
Focus: $(-3, 3)$

Directrix: $y = -1$

$4p = 8$
$p = 2$

y-int $(x=0)$

$(0+3)^2 = 8(y-1)$
$9 = 8y - 8$
$17 = 8y$
$y = \frac{17}{8} \approx 2.125$

$F = 3 \cdot (0, 2.125)$

$y = -1$

#14. Find an equation of the hyperbola with vertices (-9, 0) and (5, 0) and foci (-10, 0) and (6, 0).
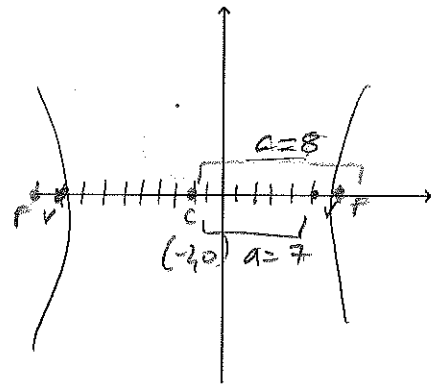
$\dfrac{(x-h)^2}{a^2} - \dfrac{(y-k)^2}{b^2} = 1$

$\boxed{\dfrac{(x+2)^2}{49} - \dfrac{y^2}{15} = 1}$
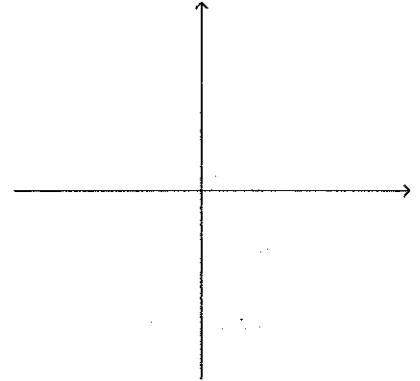
$c^2 = a^2 + b^2$
$64 = 49 + b^2$
$b^2 = 64 - 49$
$b^2 = 15$

$a = 8$

$(-2, 0)$ $a = 7$

#1. Find the equation of the parabola with focus (6, -4) and vertex (2, -4)
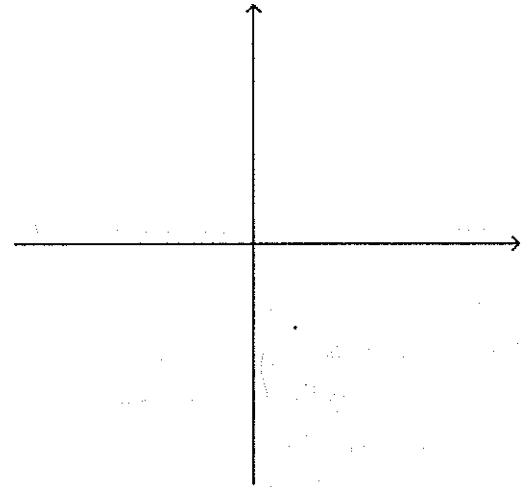
#2. Graph the equation (label important features): $\dfrac{(y-1)^2}{9} - \dfrac{(x+2)^2}{4} = 1$
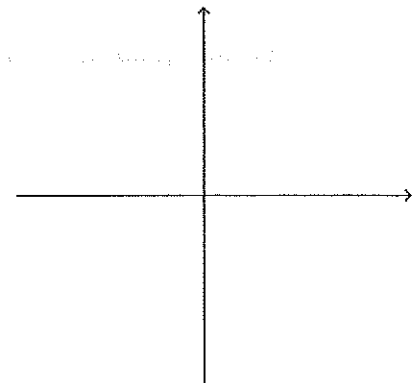
Center:_____

Vertices:_____

Foci: _____

Asymptotes: _____

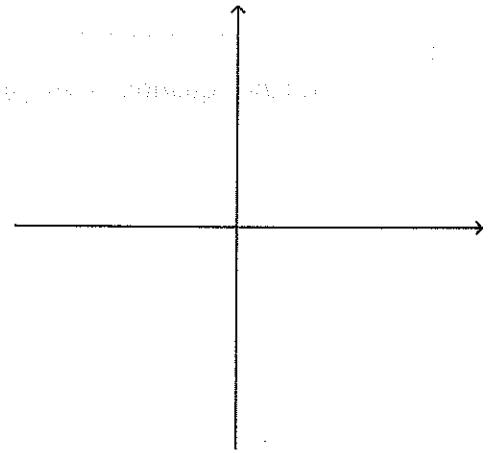#3. Find an equation of the ellipse with major axis 10 units long and foci at (1, 0) and (1, -6)

#4. Graph the equation (label important features): $\dfrac{(x+2)^2}{49}+\dfrac{(y-1)^2}{4}=1$

Center: _____

Vertices: _____

Foci: _____

Eccentricity: _____

#5. Put the equation in standard form. $8x = y^2 - 4y - 4$

Tell which conic is represented by the equation.

#6. $6x^2 - 6y^2 - 3x - 5y + 3 = 0$

#7. $-2x^2 + 3x + 4y - 10 = 0$

#8. $-4x^2 + 6y^2 - 3x + 2y - 4 = 0$

#9. $2x^2 - 3x - 2y - 12 = 0$

#10. $8x^2 + 8y^2 + 2y - 6 = 0$

#11. $12x^2 + 7y^2 + 3x + 4y + 6 = 0$

#12. Put the equation in standard form. $x^2 + 25y^2 - 6x + 100y + 84 = 0$
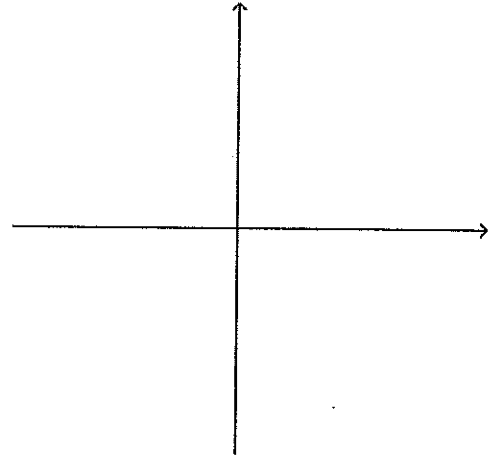
#13. Graph the equation (label important features)

$$(x+3)^2 = 8(y-1)$$

Vertex: _____

Focus: _____

Directrix: _____

#14. Find an equation of the hyperbola with vertices (-9, 0) and (5, 0)
and foci (-10, 0) and (6, 0).