**PreCalculus 10.1 to 10.4 Review**

Lines Parabola Ellipse Hyperbola

$m=\tan(θ)$ $\left(x-h\right)^{2}=4p\left(y-k\right)$ $\frac{\left(x-h\right)^{2}}{a^{2}}+\frac{\left(y-k\right)^{2}}{b^{2}}=1$ $\frac{\left(x-h\right)^{2}}{a^{2}}-\frac{\left(y-k\right)^{2}}{b^{2}}=1$

$\tan(θ)=\left|\frac{m\_{2}-m\_{1}}{1+m\_{1}∙m\_{2}}\right|$ $\left(y-k\right)^{2}=4p\left(x-h\right)$ $\frac{\left(x-h\right)^{2}}{b^{2}}+\frac{\left(y-k\right)^{2}}{a^{2}}=1$ $\frac{\left(y-k\right)^{2}}{a^{2}}-\frac{\left(x-h\right)^{2}}{b^{2}}=1$

$d=\frac{\left|Ax\_{1}+By\_{1}+C\right|}{\sqrt{A^{2}+B^{2}}}$ $ (p is dist.from V to F)$ $c^{2}=a^{2}-b^{2}$ $c^{2}=a^{2}+b^{2}$

**10.1 Lines**

Find the inclination $θ$ (in degrees) of the line: $4x+7y-8=0$

Find the angle $θ$ (in radians) between the lines: $y=3x+7$ and $2x+5y-10=0$

Find the distance between the point $\left(4, -2\right)$ and the line $y=-3x+7$.

**10.2 Parabolas**

Write the equation in standard form for the parabola with vertex (0, 2) and directrix: $x=-3$.

Graph the parabola: $\left(y-4\right)^{2}=20\left(x+1\right)$

**10.3 Ellipses**

Write the equation in standard form for the ellipse with vertices (4, 3) and (4, 7); and foci (4, 4) and (4, 6).

Graph the ellipse: $\frac{\left(x+1\right)^{2}}{25}+\frac{\left(y-2\right)^{2}}{49}=1$

Graph the ellipse: $16x^{2}+9y^{2}-32x+72y+16=0$

**10.4 Hyperbolas**

Write the equation in standard form for the hyperbola with vertices $\left(0, \pm 1\right)$ and foci $\left(0, \pm 2\right)$.

Graph the hyperbola: $\frac{\left(x-5\right)^{2}}{36}-\frac{\left(y+3\right)^{2}}{16}=1$

Graph the hyperbola: $9x^{2}-16y^{2}-18x-32y-151=0$

**10.1 Lines**

Find the inclination $θ$ (in degrees) of the line: $4x+7y-8=0$ $θ=150.3°$

Find the angle $θ$ (in radians) between the lines: $y=3x+7$ and $2x+5y-10=0$ $θ=1.512 radians$

Find the distance between the point $\left(4, -2\right)$ and the line $y=-3x+7$ $\frac{3\sqrt{10}}{10}≈0.95$

**10.2 Parabolas**

Write the equation in standard form for the parabola with vertex (0, 2) and directrix: $x=-3$.

 $\left(y-2\right)^{2}=12x$

Graph the parabola: $\left(y-4\right)^{2}=20\left(x+1\right)$

 Vertex: $\left(-1, 4\right)$

 Focus: $\left(4, 4\right)$

 Directrix: $x=-6$

**10.3 Ellipses**

Write the equation in standard form for the ellipse with vertices (4, 3) and (4, 7); and foci (4, 4) and (4, 6).

 $\frac{\left(x-4\right)^{2}}{3}+\frac{\left(y-5\right)^{2}}{4}=1$

Graph the ellipse: $\frac{\left(x+1\right)^{2}}{25}+\frac{\left(y-2\right)^{2}}{49}=1$

 Center: $\left(-1, 2\right)$

 Vertices: $\left(-1, 9\right) and \left(-1, -5\right)$

 Co-Vertices: $\left(4, 2\right) and \left(-6, 2\right)$

 Foci: $\left(-1, 4\pm 2\sqrt{6}\right)$

Graph the ellipse: $16x^{2}+9y^{2}-32x+72y+16=0$ $\frac{\left(x-1\right)^{2}}{9}+\frac{\left(y+4\right)^{2}}{16}=1$

 Center: $\left(1, -4\right)$

 Vertices: $\left(1, 0\right) and \left(1, -8\right)$

 Co-Vertices: $\left(-2, -4\right) and \left(4, -4\right)$

 Foci: $\left(1, -4\pm \sqrt{7}\right)$

**10.4 Hyperbolas**

Write the equation in standard form for the hyperbola with vertices $\left(0, \pm 1\right)$ and foci $\left(0, \pm 2\right)$.

 $\frac{y^{2}}{1}-\frac{x^{2}}{3}=1$

Graph the hyperbola: $\frac{\left(x-5\right)^{2}}{36}-\frac{\left(y+3\right)^{2}}{16}=1$

 Center: $\left(5, -3\right)$

 Vertices: $\left(11, -3\right) and \left(-1, -3\right)$

 Foci: $\left(5\pm 2\sqrt{13}, -3\right)$

 Asymptotes: $y+3=\pm \frac{2}{3}\left(x-5\right)$

Graph the hyperbola: $9x^{2}-16y^{2}-18x-32y-151=0$ $\frac{\left(x-1\right)^{2}}{16}-\frac{\left(y+1\right)^{2}}{9}=1$

 Center: $\left(1, -1\right)$

 Vertices: $\left(-3, -1\right) and \left(5, -1\right)$

 Foci: $\left(-4, -1\right) and \left(6, -1\right)$

 Asymptotes: $y+1=\pm \frac{3}{4}\left(x-1\right)$