Precalculus Name _____

Hyperbolas "Neg squared goes 2nd"

Use the information provided to write the standard form equation of each hyperbola.

1) $x^2 - 4y^2 + 8x - 16y - 100 = 0$

$x^2+8x+\_\_ -4y^2-16y+\_\_ = 100+\_\_ +\_\_$

$x^2+8x+16 -4(y^2+4y\ 4) = 100+1(16)+-4(4)$

$\frac{(x+4)^2}{100} - \frac{4(y+2)^2}{100} = \frac{100}{100}$

$\frac{(x+4)^2}{100} - \frac{(y+2)^2}{25} = 1$

2) $x^2 - 4y^2 + 10x - 72y - 399 = 0$

$x^2+10x+\_\_ -4y^2-72y+\_\_ = 399+\_\_ +\_\_$

$x^2+10x+25 -4(y^2+18y+81) = 399+1(25)+-4(81)$

$\frac{(x+5)^2}{100} - \frac{4(y+9)^2}{100} = \frac{100}{100}$

$\frac{(x+5)^2}{100} - \frac{(y+9)^2}{25} = 1$

3) $-x^2 + 16y^2 + 14x - 64y - 49 = 0$

$16y^2-64y+\_\_ -x^2+14x+\_\_ = 49+\_\_ +\_\_$

$16(y^2-4y+4) -1(x^2-14x+49) = 49+16(4)+-1(49)$

$\frac{16(y-2)^2}{64} - \frac{(x-7)^2}{64} = \frac{64}{64}$

$\frac{(y-2)^2}{4} - \frac{(x-7)^2}{64} = 1$

4) $-x^2 + 40y^2 - 6x - 209 = 0$

$40y^2 - x^2 - 6x + \_\_ = 209 + \_\_$

$40y^2 - 1(x^2+6x+9) = 209 + -1(9)$

$\frac{40y^2}{200} - \frac{(x+3)^2}{200} = \frac{200}{200}$

$\frac{y^2}{5} - \frac{(x+3)^2}{200} = 1$

5) $4x^2 - 49y^2 - 72x + 196y - 68 = 0$

$4x^2-72x+\_\_ -49y^2+196y+\_\_ = 68+\_\_ +\_\_$

$4(x^2-18x+81) -49(y^2-4y+4) = 68+4(81)+-49(4)$

$\frac{4(x-9)^2}{196} - \frac{49(y-2)^2}{196} = \frac{196}{196}$

$\frac{(x-9)^2}{49} - \frac{(y-2)^2}{4} = 1$

6) $4x^2 - 3y^2 + 24x + 48y - 216 = 0$

$4x^2+24x+\_\_ -3y^2+48y+\_\_ = 216+\_\_ +\_\_$

$4(x^2+6x+9) -3(y^2-16y+64) = 216+4(9)+-3(64)$

$\frac{4(x+3)^2}{60} - \frac{3(y-8)^2}{60} = \frac{60}{60}$

$\frac{(x+3)^2}{15} - \frac{(y-8)^2}{20} = 1$

7) $64x^2 - 9y^2 - 384x + 72y - 144 = 0$

$64x^2-384x+\_\_ -9y^2+72y+\_\_ = 144+\_\_ +\_\_$

$64(x^2-6x+9) -9(y^2-8y+16) = 144+64(9)+-9(16)$

$\frac{64(x-3)^2}{576} - \frac{9(y-4)^2}{576} = \frac{576}{576}$

$\frac{(x-3)^2}{9} - \frac{(y-4)^2}{64} = 1$

8) $-11x^2 + 8y^2 - 88x + 160y + 184 = 0$

$8y^2+160y+\_\_ -11x^2-88x+\_\_ = -184+\_\_ +\_\_$

$8(y^2+20y+100) -11(x^2+8x+16) = -184+8(100)+-11(16)$

$\frac{8(y+10)^2}{440} - \frac{11(x+4)^2}{440} = \frac{440}{440}$

$\frac{(y+10)^2}{55} - \frac{(x+4)^2}{40} = 1$

9) $-25x^2 + 9y^2 - 150x + 90y - 225 = 0$

$9y^2+90y+\_\_ -25x^2-150x+\_\_ = 225+\_\_ +\_\_$

$9(y^2+10y+25) -25(x^2+6x+9) = 225+9(25)+-25(9)$

$\frac{9(y+5)^2}{225} - \frac{25(x+3)^2}{225} = \frac{225}{225}$

$\frac{(y+5)^2}{25} - \frac{(x+3)^2}{9} = 1$

10) $-4x^2 + 25y^2 - 16x + 100y - 316 = 0$

$25y^2+100y+\_\_ -4x^2-16x+\_\_ = 316+\_\_ +\_\_$

$25(y^2+4y+4) -4(x^2+4x+4) = 316+25(4)+-4(4)$

$\frac{25(y+2)^2}{400} - \frac{4(x+2)^2}{400} = \frac{400}{400}$

$\frac{(y+2)^2}{16} - \frac{(x+2)^2}{100} = 1$