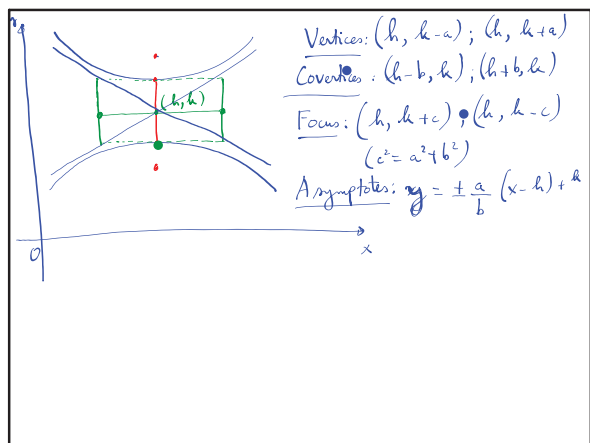




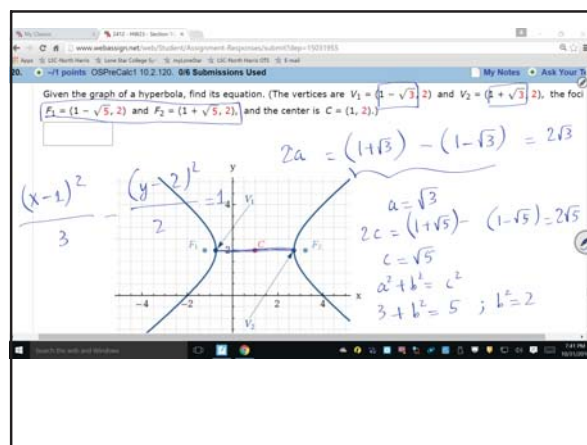
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$y^2 - 10y - (3x^2 - 6x) = -13$
 Write this in standard form of a hyperbola.
 $y^2 - 10y + 25 - (3(x^2 - 2x + 1)) = -13 + 25 - 3$
 $(y-5)^2 - 3(x-1)^2 = 9$
 $\frac{(y-5)^2}{9} - \frac{(x-1)^2}{3} = 1$

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Eg $4x^2 - 24x - 9y^2 - 72y + 72 = 0$
 $4(x^2 - 6x) - 9(y^2 + 8y) = -72$
 $4(x^2 - 6x + 9) - 9(y^2 + 8y + 16) = -72 + 36 - 144$
 $4(x-3)^2 - 9(y+4)^2 = -180$
 $\frac{(x-3)^2}{45} - \frac{(y+4)^2}{20} = 1$ Center: $(3, -4)$
 $\frac{(y+4)^2}{20} - \frac{(x-3)^2}{45} = 1$ $c^2 = 65$
 $c = \sqrt{65}$
 Vertices: $(3-\sqrt{20}, -4); (3+\sqrt{20}, -4)$ Focus: $(3-\sqrt{65}, -4); (3+\sqrt{65}, -4)$

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