EVHS Algebra 2 Unit 6 Practice Test (Part 2)

> Here are the <u>basic features</u> for different kinds of conic sections, you will use them in this part of the unit test:
> (a) circle: radius, center
> (b) ellipse: center, vertices, co-vertices, foci, major axis, minor axis.
> (c) parabola: vertex, focus, directrix, a.o.s, opening, x-intercepts and y-intercepts.
> (d) hyperbola: vertices, foci, transverse axis, equations of the asymptotes

1. Joanna is entering a contest to design a logo for her high school football team. Her basic idea of the design is to use an ellipse to outline the logo and the two branches of a hyperbola that passes through the ellipse. As she started her sketch, she decided that the ellipse has foci at (4, 1) and (-2, 1) and the distance between the vertices of the ellipse is 8. Also the hyperbola in her sketch has the same foci as the ellipse with the distances between the vertices of the hyperbola to be 4.

(a) Graph and identify the basic features of the ellipse in her design.

(b) Graph and identify the basic features of the hyperbola in her design.

[Please overlay the graphs in question (a) and (b)]

(c) Write the equations of the ellipse and the hyperbola in Joanna's design.

(d) Use the equations you found from (c) to find the intersections of the ellipse and the hyperbola.(Do not write the answers in decimals. You do not need to rationalize your answer either. Ex: leave $\sqrt{\dfrac{21}{167}}$, you do not have to rationalize it to $\dfrac{\sqrt{3507}}{167}$)

2. You need to use GRASP approach on this question:

In music, the governing equation of the frequencies between two notes can be modeled as follow:

$\log_{\sqrt[12]{2}}\left(\dfrac{f_n}{f_0}\right) = n$ where n is the steps between a note and a reference note

f_n is the frequency of a note n step away from the reference note.

f_0 is the frequency of the reference note.

Given that the open A string of a violin to be 440 Hz. Find the frequency of the open E string next to the A string? (there are +7 steps between Key A to Key E)