

EC. 1

Since the foci are located on a horizontal line, the transverse axis is horizontal.

$$a = \frac{8}{2} = 4$$

Equations of the asymptotes:

$$y - (-2) = \pm \frac{5}{4}(x - 1)$$

$$4y + 8 = \pm 5x \mp 5$$

$$4y + 8 = 5x - 5, \text{ and}$$

$$4y + 8 = -5x + 5$$

The vertices:

$$(h \pm a, k)$$

$$= (1 \pm 4, -2)$$

$$= (-3, -2), (5, -2)$$

For  $b$ :

Using the  $x$ -coordinates of one of the vertices:

$$4y + 8 = 5(-3) - 5$$

$$y = -7$$

Distance between  $-7$  and  $-2$  is 5

$$b = 5$$

$$(h, k) = (1, -2)$$

$$a = 4$$

$$b = 5$$

Using the standard form:

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

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

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

EC. 2

$$x + 2y + z = 0 \cdots (1)$$

$$3x + 2y - z = 4 \cdots (2)$$

$$-x + 2y + 3z = -4 \cdots (3)$$

Method of choice: **elimination**

(1) + (2):

$$x + 2y + z = 0 \cdots (1)$$

$$3x + 2y - z = 4 \cdots (2)$$

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$$4x + 4y = 4$$

$$x + y = 1 \cdots (4)$$

(3) + 3(2):

$$-x + 2y + 3z = -4 \cdots (3)$$

$$9x + 6y - 3z = 12 \cdots 3(2)$$

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$$8x + 8y = 8$$

$$x + y = 1 \cdots (5)$$

Since we obtained two same equations by eliminating different equations, there are infinite solutions. Using (2), we write:

$$z = 3x + 2y - 4$$

From (4) and (5):  $y = 1 - x$

$$z = 3x + 2(1 - x) - 4$$

$$z = x - 2$$

Since  $x$  is a free variable, replace it with  $t$

$$\mathbf{z = t - 1}$$

EC. 3

This being my first semester I thought that it was just like high school. Easy. While most classes are easy I did overwhelm myself by adding 15 credits with math being one of them. I learned that during the next semesters of college I am going to take it easy but definitely add more online classes to my plan.

P.S. Professor Orr thank you very much for helping me throughout this semester and for taking the time to teach us properly.