

## Answer on Question #69891 – Math – Calculus

### Question

Find the center, vertices, and foci of the ellipse with equation  $2x^2 + 7y^2 = 14$ .

### Solution

Let us divide by 14:

$$2x^2 + 7y^2 = 14 \quad | :14$$

$\frac{x^2}{7} + \frac{y^2}{2} = 1$ , now we have the canonical equation of the ellipse in the form:

$$\frac{(x-x_0)^2}{a^2} + \frac{(y-y_0)^2}{b^2} = 1 \text{ with center } (x_0, y_0) \text{ and vertices}$$

$$(x_0 + a, y_0); (x_0 - a, y_0); (x_0, y_0 + b); (x_0, y_0 - b);$$

$$\text{foci are } (x_0 + \sqrt{a^2 - b^2}, y_0); (x_0 - \sqrt{a^2 - b^2}, y_0);$$

In our case  $x_0 = 0, y_0 = 0, a = \sqrt{7}, b = \sqrt{2}$ , so center is  $(0, 0)$  and vertices are

$$(\sqrt{7}, 0), (-\sqrt{7}, 0), (0, \sqrt{2}), (0, -\sqrt{2}), \text{ foci are}$$

$$(0 + \sqrt{7 - 2}, 0) = (\sqrt{5}, 0); (0 - \sqrt{7 - 2}, 0) = (-\sqrt{5}, 0);$$

**Answer:**

$$(0, 0)$$

$$(\sqrt{7}, 0), (-\sqrt{7}, 0), (0, \sqrt{2}), (0, -\sqrt{2})$$

$$(\sqrt{5}, 0); (-\sqrt{5}, 0).$$