Example 1 Parabolas p. 3 Ch 11

$$8x^2 + 12y = 0$$

- 1st separate the squared variable & first degree variable using algebra

$$8x^2 + 12y - 12y = 0 - 12y$$

$$8x^2 = -12y$$

- Make the numeric coefficient of the squared variable one

$$8x^2 \div 8 = -12y \div 8$$

- Simplify

$$x^2 = -{}^{3}/_{2}\, y$$

$$x^2 = -\frac{3}{2}y$$

- Find p. You know that the coefficient of y is 4p, so use algebra

$$4p = -\frac{3}{2}$$

So, $4p \div 4 = -\frac{3}{2} \div 4$

Therefore, $p = -\frac{3}{2} \bullet \frac{1}{4} = -\frac{3}{8}$

a) Find the Focus (0, p)

- Use p to give the focus. For a up/down facing parabola the focus will be (0, p).

$$F(0, -{}^{3}/_{8})$$

b) Find Directrix

- Since this is an downward facing parabola (what we would once have looked at as $y = ax^2$) this is a horizontal line p units above the vertex, which is (0, 0) in this case

$$y = {}^{3}/_{8}$$

c) Find the focal diameter

- The focal diameter is 4 times p's distance (that means absolute value is used) or 2 times p's distance on either side of the focus

$$|4 \bullet -{}^{3}/_{8}| = {}^{3}/_{2}$$

and $|2 \bullet -{}^{3}/_{8}| = {}^{3}/_{4}$ which is more helpful in finding 2 more points on the parabola

$(-{}^{3}/_{4}, -{}^{3}/_{8})$ & $({}^{3}/_{4}, -{}^{3}/_{8})$ are the points on the parabola equidistant from the focus

d) Sketch the graph

- 1st Place the vertex
- 2nd Place the directrix
- 3rd Place the 2 points

on the focal diameter

- 4th Draw the parabola