Ellipse

NCEES® FE Reference Handbook Pages 39 – 45

STUDY FOR FE

Compare these equations with the ones in NCEES® FE Handbook?

Standard Equation:

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

Center $(h\,,k)$

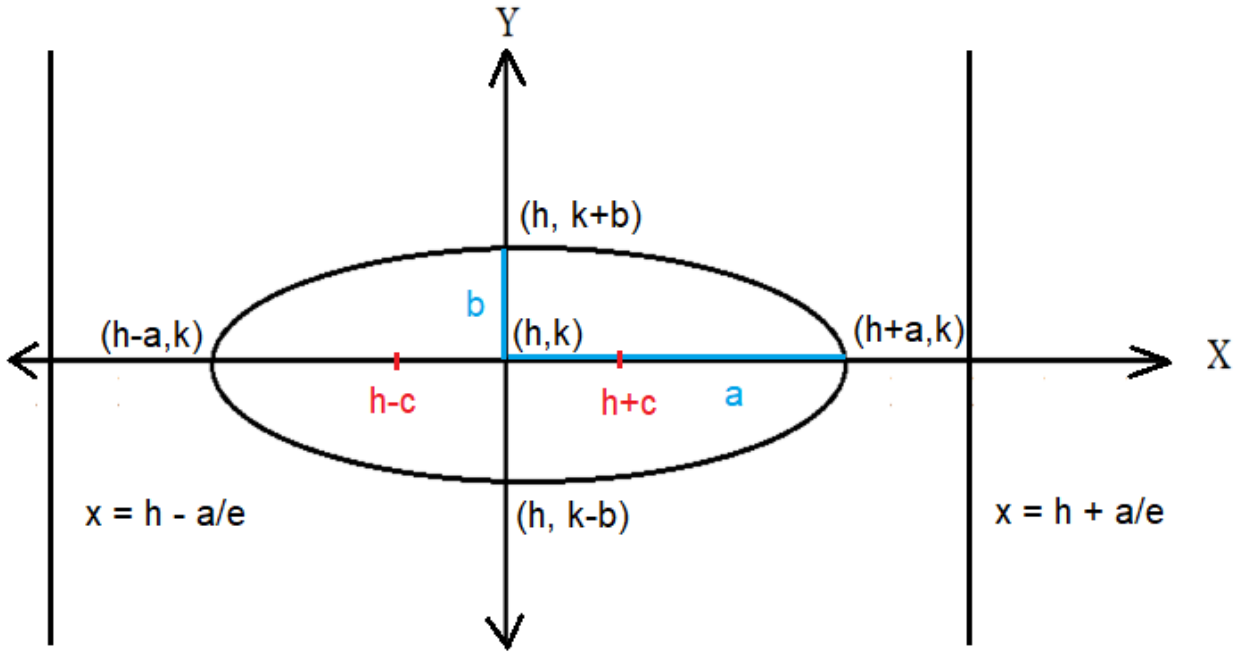
Vertices $(h\pm a\,,k)\;(h\,,k\pm b)$

Eccentricity < 1 $e=\sqrt{1-\left(\frac{b^2}{a^2}\right)}=\frac{c}{a}$

$$c^2=a^2-b^2$$

Focus $(h\pm c\,,k)$

Directrix $x=h\pm\frac{a}{e}=h\pm\frac{a^2}{c}$



- Circle has eccentricity = 0
- Ellipse has + sign between squares.
- 'a' is always greater than 'b'
- If 'a' shows up under 'x^2', we have a wide/fat ellipse.

Ellipse

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STUDY FOR FE

Standard Equation:

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

This form is not given in NCEES® FE Handbook?

- Ellipse has + sign between squares.
- ‘a’ is always greater than ‘b’
- If ‘a’ shows up under ‘y^2’, we have a tall/slim ellipse.

Center $(h\,,k)$

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

Eccentricity < 1 $e=\sqrt{1-\left(\frac{b^2}{a^2}\right)}=c/a$

$c^2=a^2-b^2$

Focus $(h\,,k\pm c)$

Directrix $y=k\pm\frac{a}{e}=k\pm\frac{a^2}{c}$