Pre-Calc
8.2B Lecture Notes, Ellipses

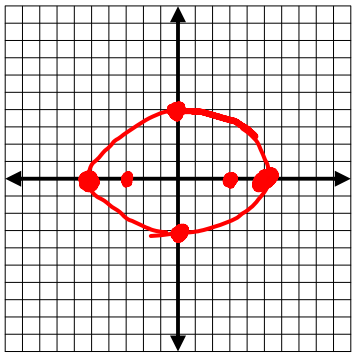
Name Solutions

Write an equation in standard form for each ellipse.

a) Foci at $(\pm 3, 0)$; endpoints of major axis $(\pm 5, 0)$

$a = 5 \quad c = 3 \quad b = 4$

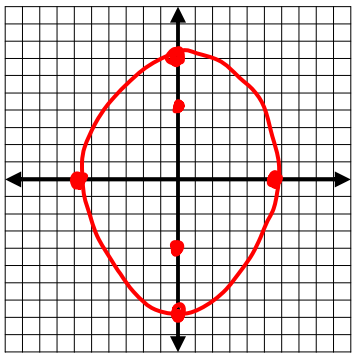
$$\frac{x^2}{25} + \frac{y^2}{16} = 1$$



b) Foci at $(0, \pm 4)$; endpoints of major axis $(0, \pm 7)$

$a = 7 \quad c = 4 \quad b = \sqrt{33} \approx 5.7$

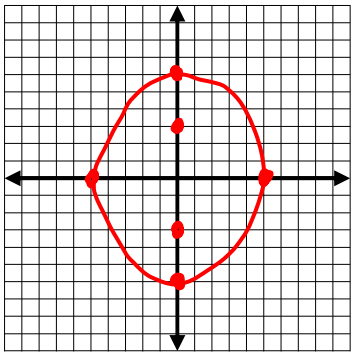
$$\frac{x^2}{33} + \frac{y^2}{49} = 1$$



c) Foci at $(0, \pm 3)$; major axis length = 12

$a = 6 \quad c = 3 \quad b = \sqrt{27} \approx 5.2$

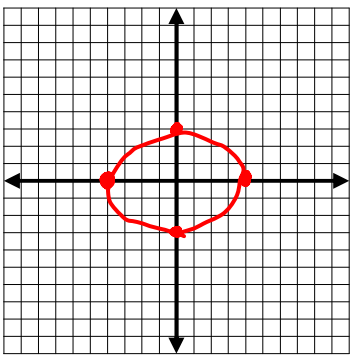
$$\frac{x^2}{27} + \frac{y^2}{36} = 1$$



d) Endpoints of major axis at $(\pm 4, 0)$; Endpoints of minor axis at $(0, \pm 3)$

$a = 4 \quad b = 3$

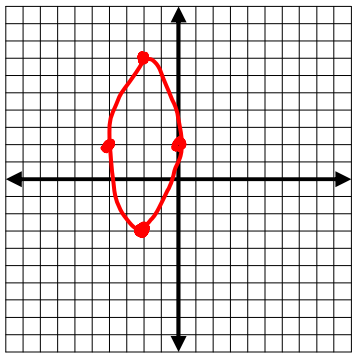
$$\frac{x^2}{16} + \frac{y^2}{9} = 1$$



e) The endpoints of one axis are $(-2,-3)$ *and* $(-2,7)$ and of the other are $(-4,2)$ *and* $(0,2)$

$a=5 \quad b=2$

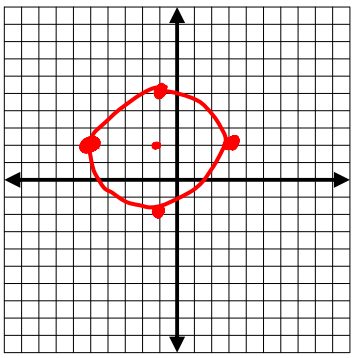
$$\frac{(x+2)^2}{4}+\frac{(y-2)^2}{25}=1$$



f) The major axis endpoints are $(-5,2)$ *and* $(3,2)$; the minor axis is length 6,

$a=4 \quad b=3$

$$\frac{(x+1)^2}{16}+\frac{(y-2)^2}{9}=1$$



g) State the location of the center, the length of the semi-major and semi-minor axis, and write in parametric form: $\frac{x^2}{36}+\frac{y^2}{25}=1$

$C(0,0), \; a=6, \; b=5$

$x = 6\cos t$

$y = 5\sin t$

h) State the location of the center, the length of the semi-major and semi-minor axis, and write in parametric form: $\frac{(x-2)^2}{16}+\frac{(y+1)^2}{12}=1$.

$C(2,-1), \; a=4, \; b=\sqrt{12}$

$x = 2+4\cos t$

$y = -1+\sqrt{12}\sin t$

i) Put the equation. $3x^2+5y^2-12x+30y+42=0$ in to standard form.

$3x^2-12x+\_\_\_\_+5y^2+30y+\_\_\_\_=-42$

$3(x^2-4x+\underline{4})+5(y^2+6y+\underline{9})=-42$

$+12$

$+45$

$3(x-2)^2+5(y+3)^2=15$

$\frac{(x-2)^2}{5}+\frac{(y+3)^2}{3}=1$

j) Put the equation. $4x^2+y^2-32x+16y+124=0$ in to standard form.

typo (−128)

$4(x^2-8x+\_\_\_\_)+y^2+16y+\_\_\_\_=128$

$4(x^2-8x+16)+y^2+16y+64=128$

$+64$

$+64$

$4(x-4)^2+(y+8)^2=256$

$\frac{(x-4)^2}{64}+\frac{(y+8)}{256}=1$