SCORE: ___ / 10 POINTS

NO CALCULATORS ALLOWED

For the conic $r = \dfrac{6}{3 + 2\cos\theta}$:

[1]   Find the eccentricity and classify the type of the conic.
[2]   Find the rectangular equation of the directrix.
[3]   Find the center and all foci in either polar or rectangular coordinates.
[4]   Sketch the latera recta (plural of latus rectum).
[5]   Sketch the conic.

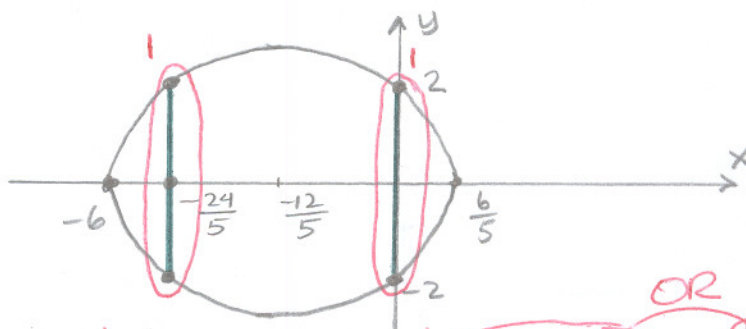$$r = \frac{6}{3 + 2\cos\theta} \cdot \frac{\frac{1}{3}}{\frac{1}{3}} = \frac{2}{1 + \frac{2}{3}\cos\theta}$$

$$e = \frac{2}{3} \implies \text{ELLIPSE (WITH VERTICAL DIRECTRIX)}$$

$$ep = 2$$
$$\frac{2}{3}p = 2$$
$$p = 3 \text{ UNITS RIGHT OF POLE} \implies x = 3$$

θ	r
0	$\frac{6}{5}$
$\frac{\pi}{2}$	2
π	6
$\frac{3\pi}{2}$	2

$$\frac{1}{2}\left(-6 + \frac{6}{5}\right) = \frac{1}{2}\left(\frac{-24}{5}\right) = \frac{-12}{5}$$

$$2\left(\frac{-12}{5}\right) = \frac{-24}{5}$$

CENTER AT $\left(\frac{-12}{5}, 0\right)$ OR $\left(\frac{12}{5}, \pi\right)$

FOCUS AT $\left(\frac{-24}{5}, 0\right)$ OR $\left(\frac{24}{5}, \pi\right)$

OR

AND $(0, 0)$ OR $(0, \theta)$

OR

GRAPH OF ELLIPSE
PASSING THROUGH   2
VERTICES AND ENDS
OF LATERA RECTA