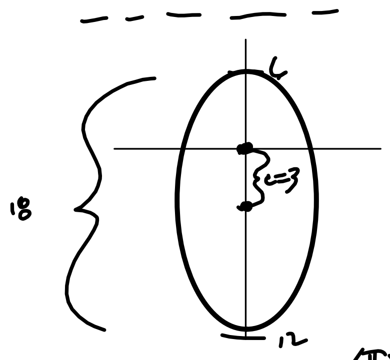
$\left(6, \frac{\pi}{2}\right), \left(12, \frac{3\pi}{2}\right)$



$2a = 18$

$a = 9$

$e = \frac{c}{a} = \frac{3}{9} = \frac{1}{3}$

$r = \frac{ep}{1 + e\sin\theta} = \frac{\frac{1}{3}p}{1 + \frac{1}{3}\sin\theta}$

$r\left(\frac{\pi}{2}\right) = 6 = \frac{\frac{1}{3}p}{1 + \frac{1}{3}(1)} = \frac{\frac{1}{3}p}{\frac{4}{3}} = \frac{1}{4}p = 6$

$p = 24$

$r(\theta) = \frac{8}{1 + \frac{1}{3}\sin\theta}$

$\frac{ep}{1 \pm e\sin\theta}$ → + d above; − d below

$\frac{ep}{1 \pm e\cos\theta}$ → + right directrix; − left ..

$\frac{ep}{1 + e\sin\theta}$

$r\left(\frac{\pi}{2}\right) = 6 = \frac{ep}{1+e} = 6 \implies ep = 6 + 6e$

$r\left(\frac{3\pi}{2}\right) = 12 = \frac{ep}{1-e} = 12 \implies ep = 12 - 12e$

$ep = ep$

$6 + 6e = 12 - 12e$

$18e = 6$

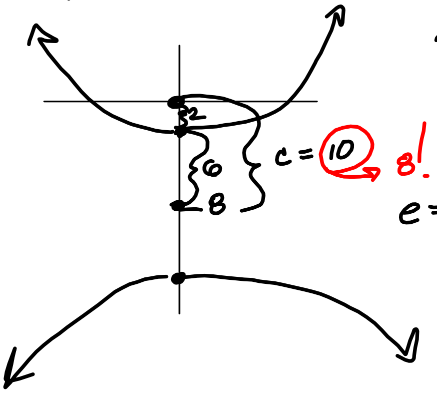
$\boxed{e = \frac{1}{3}}$ etc.

ellipse: $c^2 = a^2 - b^2$ $\qquad e = \frac{c}{a}$

hyperbola $c^2 = a^2 + b^2$

$(-2, \frac{\pi}{2})$?

Hyp: $(2, \frac{3\pi}{2}), (14, \frac{3\pi}{2})$



$2a = 12$

$a = 6$

$e = \frac{c}{a} = \frac{10}{6} = \frac{5}{3}$

$r(\frac{3\pi}{2}) = 2$

$\frac{\frac{5}{3}p}{1 - \frac{5}{3}\sin\theta}$

$r(\frac{3\pi}{2}) = 2 = \frac{\frac{5}{3}p}{1 + \frac{5}{3}} = 2$ $\quad$ −!

John Krise

$\frac{\frac{5}{3}p}{\frac{8}{3}} = \frac{5}{8}p = 2$ $\qquad$ $\frac{\frac{5}{3}p}{-\frac{2}{3}} = 2$

$-\frac{2}{3}$

$p = 2(\frac{8}{5}) = \frac{16}{5}$ $\qquad$ $-\frac{5}{2}p = 2$

$p = -\frac{4}{5}$

$\frac{ep}{1 - e\sin\theta} = \frac{\frac{5}{3} \cdot \frac{16}{5}}{1 - \frac{5}{3}\sin\theta} = \frac{\frac{16}{3}}{1 - \frac{5}{3}\sin\theta}$ $\quad$ $-\frac{4}{5}$ $\quad$ $-\frac{4}{3}$

$= \frac{16}{3 - 5\sin\theta} = r$

$e = \frac{5}{3}$:

$\frac{ep}{1 - e\sin\theta} = \frac{\frac{5}{3}p}{1 - \frac{5}{3}\sin\theta}$

$r(\frac{3\pi}{2}) = 14$

$\frac{\frac{5}{3}p}{1 + \frac{5}{3}} = \frac{\frac{5}{3}p}{\frac{8}{3}} = 14$

$\frac{5}{3}p = \frac{14(8)}{3}$

$p = \frac{14(8)}{3}(\frac{3}{5}) = \frac{14(8)}{5}$

$(2, \frac{3\pi}{2}), (14, \frac{3\pi}{2})$

$a = 6, \; c = 8$

$e = \frac{c}{a} = \frac{8}{6} = \frac{4}{3}$

$$\frac{\frac{4}{3}p}{1 - \frac{4}{3}\sin\theta}$$

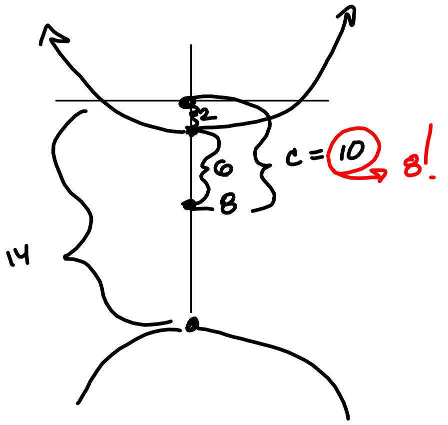
$r(\frac{3\pi}{2}) = 2$ $\qquad \frac{\frac{4}{3}p}{1 + \frac{4}{3}} = 2$

$$\frac{\frac{4}{3}p}{\frac{7}{3}} = \frac{3}{7} \cdot \frac{4}{3} p = \frac{4}{7} p = 2$$

$$p = \frac{14}{4} = \frac{7}{2} = p$$

$$\frac{ep}{1 - e\sin\theta} = \frac{\frac{4}{3}}{1 - \frac{4}{3}\sin\theta} = \frac{4}{3 - 4\sin\theta}$$

$r(\frac{\pi}{2}) = -2$?



$$e = \frac{c}{a} = \frac{8}{6} = \frac{4}{3}$$

$$r\left(\tfrac{3\pi}{2}\right) = 14 = \frac{\frac{4}{3}p}{1-\frac{4}{3}\sin\left(\frac{3\pi}{2}\right)}$$

$$= \frac{\frac{4}{3}p}{\frac{7}{3}} = \frac{3}{7}\cdot\frac{4}{3}p = \frac{4}{7}p = 14$$

$$p = \frac{14(7)}{4} = \frac{7(7)}{2} = \frac{49}{2}$$

$$\frac{ep}{1-e\sin\theta} = \frac{\left(\frac{4}{3}\right)\left(\frac{49}{2}\right)}{1-\frac{4}{3}\sin\theta} = \frac{\frac{98}{3}}{1-\frac{4}{3}\sin\theta}$$

$$= \frac{98}{3-4\sin\theta}$$

Try $r\left(\frac{\pi}{2}\right) = -14$, representing $\left(14, \frac{3\pi}{2}\right)$ as $\left(-14, \frac{\pi}{2}\right)$

$e = \frac{4}{3}$ will trust

$$r\left(\tfrac{\pi}{2}\right) = \frac{\frac{4}{3}p}{1-\frac{4}{3}\sin\frac{\pi}{2}} = -14$$

$$\frac{\frac{4}{3}p}{-\frac{1}{3}} = -14$$

$$\frac{4}{3}p = \frac{14}{3}$$

$$p = \frac{14}{3}\cdot\frac{3}{4} = \boxed{\frac{7}{2} = p}$$

$$r = \frac{\frac{4}{3}\cdot\frac{7}{2}}{1-\frac{4}{3}\sin\theta} = \frac{\frac{14}{3}}{1-\frac{4}{3}\sin\theta} = \frac{14}{3-4\sin\theta}$$

$r\left(\frac{\pi}{2}\right) = -2$?

$\frac{\frac{4}{3}p}{1-\frac{4}{3}\sin\left(\frac{\pi}{2}\right)} = -2$

$\frac{\frac{4}{3}p}{1-\frac{4}{3}} = -2$

$\frac{\frac{4}{3}p}{-\frac{1}{3}} = -2$

Nope.

$-4p = -2$

Can't remember why the $(.4, \frac{3\pi}{2}) \rightsquigarrow (-.4, \frac{\pi}{2})$ works, here.