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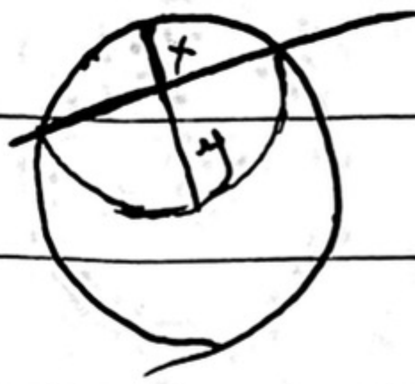
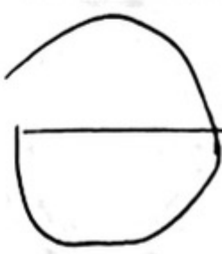
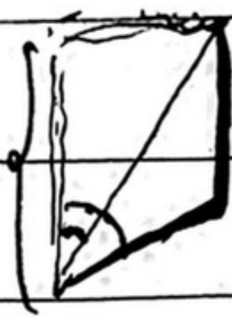
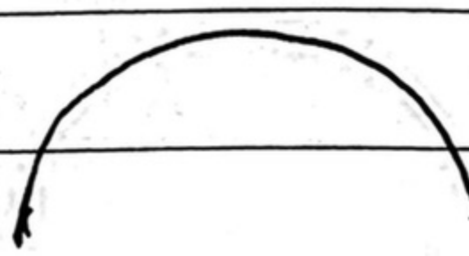


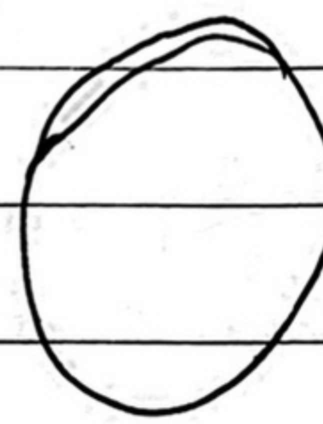

$$\frac{\sin\alpha}{y} = \frac{\sin\beta}{x}$$

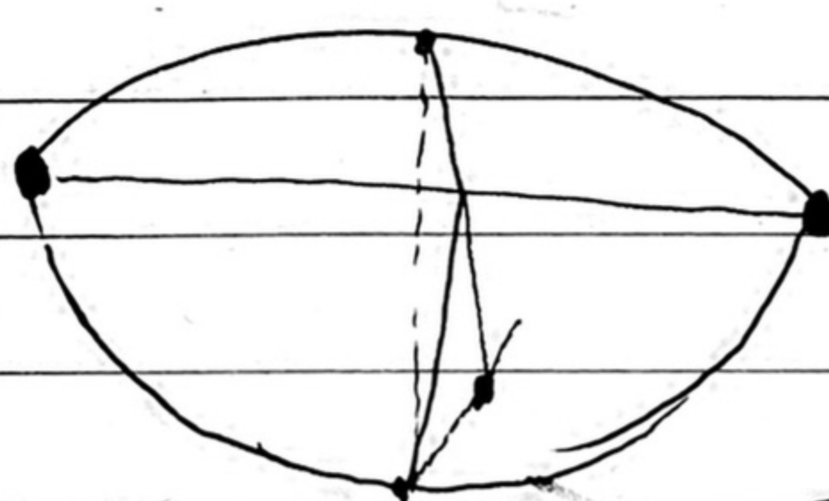





$\sin\beta =$







$$y = \sqrt{x^2 + \left(\frac{h}{\cos\alpha}\right)^2 - 2x\left(\frac{h}{\cos\alpha}\right)\cos\alpha}$$

$$L = \frac{h}{\cos\alpha}$$

$$y^2 = \sqrt{x^2 + h^2 - 2xh\cos\alpha}$$

$$y = \sqrt{x^2 + \left(\frac{h}{\cos\alpha}\right)^2 - 2xh}$$

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$$\left(\frac{a}{b}\right)^2 = \frac{a^2}{b^2}$$

$$L_2 = \sqrt{r_1^2 - (r_1 - x)^2}$$

$L_2 =$

$$L_2 = \sqrt{r_1^2 - (r_1 - x)^2} = \sqrt{r_2^2 - (r_2 - y)^2}$$

$$r_1^2 - (r_1^2 - 2r_1x + x^2) = r_2^2 - (r_2^2 - 2r_2y + y^2)$$

$$= 2r_1x - x^2 = 2r_2y - y^2$$

$$2r_1x - x^2 = 2r_2\sqrt{x^2 + \left(\frac{h}{\cos\alpha}\right)^2 - 2xh} - \left(x^2 + \left(\frac{h}{\cos\alpha}\right)^2 - 2xh\right)$$

$$2r_1x = 2r_2\sqrt{x^2 + \left(\frac{h}{\cos\alpha}\right)^2 - 2xh} - \left(\frac{h}{\cos\alpha}\right)^2 + 2xh$$

$$2r_1x + \left(\frac{h}{\cos\alpha}\right)^2 - 2xh = 2r_2\sqrt{x^2 + \left(\frac{h}{\cos\alpha}\right)^2 - 2xh}$$

$$\left(2x(r_1 - h) + \left(\frac{h}{\cos\alpha}\right)^2\right)^2 = 4r_2^2\left(x^2 + \left(\frac{h}{\cos\alpha}\right)^2 - 2xh\right)$$

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$$\left(2x(r_1-h)\right)^2+\left(\frac{h}{\cos\alpha}\right)^4+4x(r_1-h)\left(\frac{h}{\cos\alpha}\right)^2$$

$$\left(2(r_1-h)\right)^2\cdot x^2+\left(\frac{h}{\cos\alpha}\right)^4+4(r_1-h)\left(\frac{h}{\cos\alpha}\right)^2\cdot x$$

$$=4r_2^2x^2+4r_2^2\left(\frac{h}{\cos\alpha}\right)^2-8r_2^2h\cdot x$$

88518.804 595.04 6.949

$$\left[\left(2(r_1-h)\right)^2-4r_2^2\right]x^2+\left[-4(r_1-h)\left(\frac{h}{\cos\alpha}\right)^2+8r_2^2h\right]\cdot x$$

48518.1540 48.28 200601.885

$$+\left[\left(\frac{h}{\cos\alpha}\right)^4-4r_2^2\left(\frac{h}{\cos\alpha}\right)^2\right]=0$$

278.0316.730

$r_1=151.26$

$r_2=100$

$h=2.5$

$\alpha=18.5$

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$$L = \frac{h}{\cos\alpha} = 2.636$$

$r_1 = 151.26$
$r_2 = 100$
$h = 2.5$
$\alpha = 18.5$

$$y = \sqrt{x^2 + L^2 - 2xL\cos\alpha}$$

$$\frac{\sin\beta}{x} = \frac{\sin\alpha}{y}$$

$$r_1^2 - (r_1 - x)^2 = r_2^2 - (r_2 - y)^2 + r$$

$$r_1^2 - (r_1^2 - 2r_1x + x^2) = r_2^2 - (r_2^2 - 2r_2y + y^2) + r$$

$$2r_1x - x^2 = 2r_2y - y^2 + r$$

$$2r_1x - x^2 = 2r_2\sqrt{x^2 + L^2 - 2xL\cos\alpha} - (x^2 + L^2 - 2xL\cos\alpha) + r$$

$$2r_1x - \cancel{x^2} + \cancel{x^2} + L^2 - 2L\cos\alpha \cdot x - r = 2r_2\sqrt{x^2 + L^2 - 2L\cos\alpha \cdot x}$$

$$(2r_1 - 2L\cos\alpha)\cdot x + L^2 - r =$$

$(L^2 - r)^2$

$$[(2r_1 - 2L\cos\alpha)\cdot x + (L^2 - r)]^2 = 4r_2^2(x^2 + L^2 - 2L\cos\alpha \cdot x)$$

$$(2r_1 - 2L\cos\alpha)^2 \cdot x^2 + L^4 + 2L^2\cdot(2r_1 - 2L\cos\alpha)x = 4r_2^2x^2 + 4r_2^2L^2 - 8r_2^2L\cos\alpha \cdot x$$

$$[\underbrace{(2r_1 - 2L\cos\alpha)^2 - 4r_2^2}_{a}]x^2 + [\underbrace{2L^2\cdot(2r_1 - 2L\cos\alpha) + 8r_2^2L\cos\alpha}_{b}]\cdot x + (\underbrace{L^4 - 4r_2^2L^2}_{c}) = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\beta = \arcsin\left(\frac{\sin\alpha \cdot x}{y}\right)$$

$$\theta = \alpha + \beta$$

0.2
80
84
100
16
100-84

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$x = 1.0828$

$y = 1.6456$

$\beta = 12.65$

$\theta = 30.55$

$a-x$

$\sin\theta \quad \sin\beta = \frac{\sin\alpha}{y} \cdot x$

$a = 48818.1504 \quad \beta =$

$b = 204135.35703$

$c = -2779940.208$

$\sqrt{b^2-4ac} = 309211.615$

$-b+\sqrt{b^2-4ac} = 105076$

$\frac{-b+\sqrt{b^2-4ac}}{2a} = 1.0828$