Additional topics not covered in notes that you might see on a quiz/test

Converting rectangular conic equations to parametric form.

Use one of the following identities:

$\sin^2 t + \cos^2 t = 1$

$\sec^2 t - \tan^2 t = 1$

Examples

Circle: $(x - h)^2/r^2 + (y - k)^2/r^2 = 1$

let $(x - h)/r = \cos t$ so $x = r\cos t + h$

let $(y - k)/r = \sin t$ so $y = r\sin t + k$

Ellipse: $(x - h)^2/a^2 + (y - k)^2/b^2 = 1$

let $(x - h)/a = \cos t$ so $x = a\cos t + h$

let $(y - k)/b = \sin t$ so $y = b\sin t + k$

Hyperbola: $(x - h)^2/a^2 - (y - k)^2/b^2 = 1$

let $(x - h)/a = \sec t$ so $x = a\sec t + h$

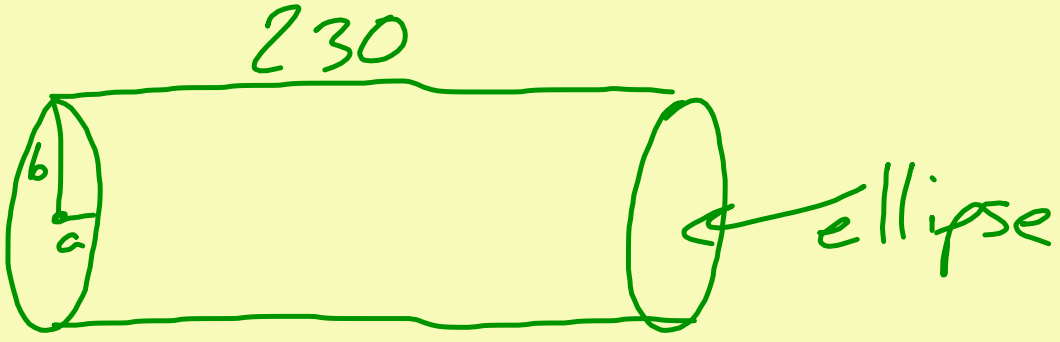
let $(y - k)/b = \tan t$ so $y = b\tan t + k$

(or vice versa for a vertical hyperbola)

Parabola:

just let $x = t$ and replace the x's with t's for y

Area of an ellipse = πab



to find circumference, use arc length (easier w/parametric)

vector parallel to target to curve $y = 8x^2 + 3$ at $(1, 11)$.

$y' = 16x$

slope at $(1, 11) = 16$

vector: $\langle 1, 16 \rangle$

unit vector has a magnitude of 1.

$$\text{unit vector} = \frac{\langle a, b \rangle}{\|\langle a, b \rangle\|}$$

$$\frac{\langle 1, 16 \rangle}{\|\langle 1, 16 \rangle\|} = \frac{\langle 1, 16 \rangle}{\sqrt{1^2 + 16^2}} = \frac{\langle 1, 16 \rangle}{\sqrt{257}}$$

unit vector

$$\left\| \frac{\langle a, b \rangle}{\|\langle a, b \rangle\|} \right\| = 1$$