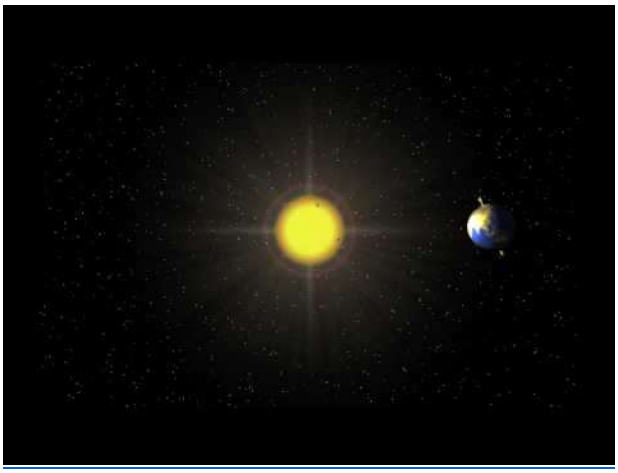
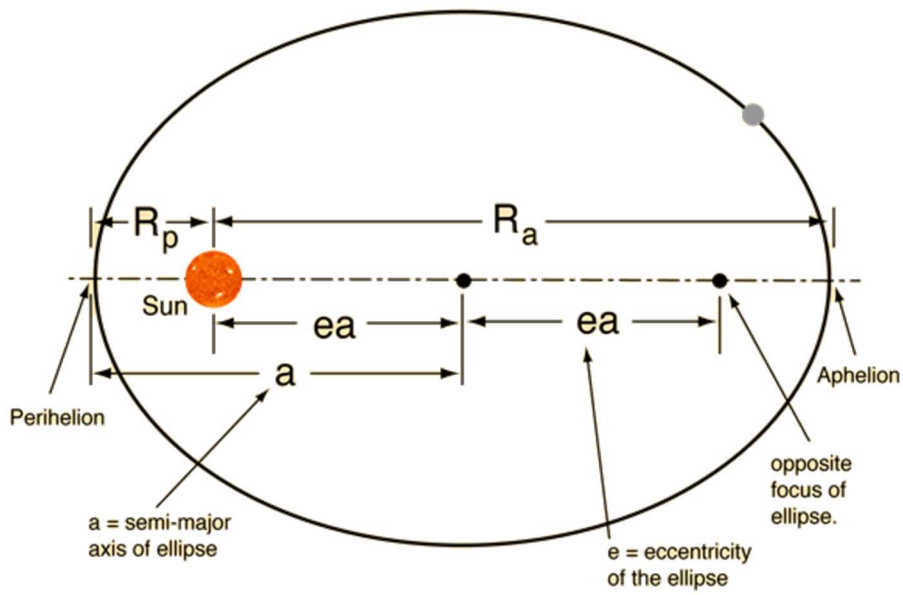
CONICS

Polar Ellipse

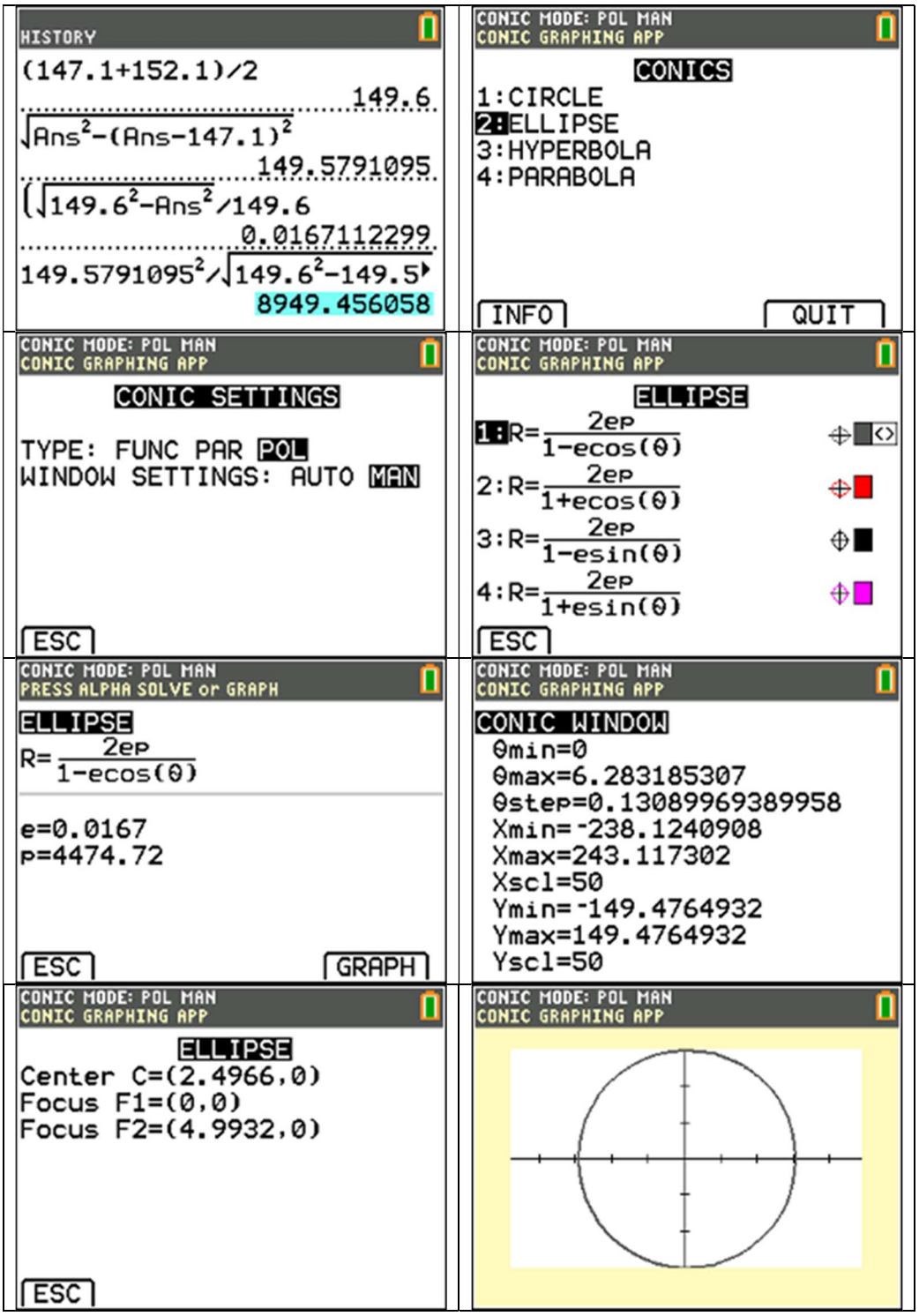




$R_a = a(1+e) \quad R_p = a(1- e)$

Earth's Perihelion and Aphelion

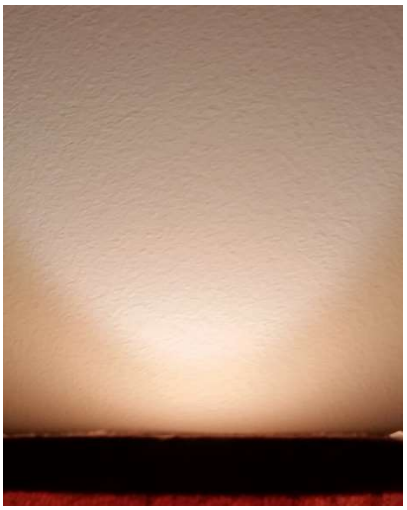
Year	Perihelion	Distance	Aphelion	Distance
2016	3 January 2016 8:48 AM	147,100,176 km	5 July 2016 2:24 AM	152,103,775 km
2017	5 January 2017 12:17 AM	147,100,998 km	4 July 2017 6:11 AM	152,092,504 km

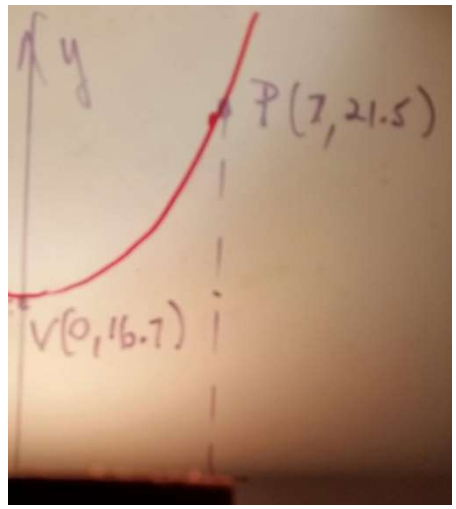

HISTORY
(147.1+152.1)/2
149.6
√Ans²-(Ans-147.1)²
149.5791095
(√149.6²-Ans²/149.6
0.0167112299
149.5791095²/√149.6²-149.5
8949.456058
CONIC MODE: POL MAN
CONIC GRAPHING APP
CONICS
1:CIRCLE
2:ELLIPSE
3:HYPERBOLA
4:PARABOLA
INFO
QUIT
CONIC MODE: POL MAN
CONIC GRAPHING APP
CONIC SETTINGS
TYPE: FUNC PAR POL
WINDOW SETTINGS: AUTO MAN
ESC
CONIC MODE: POL MAN
CONIC GRAPHING APP
ELLIPSE
1:R=2eP/(1-ecos(θ))
2:R=2eP/(1+ecos(θ))
3:R=2eP/(1-esin(θ))
4:R=2eP/(1+esin(θ))
ESC
CONIC MODE: POL MAN
PRESS ALPHA SOLVE or GRAPH
ELLIPSE
R=2eP/(1-ecos(θ))
e=0.0167
P=4474.72
ESC
GRAPH
CONIC MODE: POL MAN
CONIC GRAPHING APP
CONIC WINDOW
θmin=0
θmax=6.283185307
θstep=0.13089969389958
Xmin=-238.1240908
Xmax=243.117302
Xscl=50
Ymin=-149.4764932
Ymax=149.4764932
Yscl=50
CONIC MODE: POL MAN
CONIC GRAPHING APP
ELLIPSE
Center C=(2.4966,0)
Focus F1=(0,0)
Focus F2=(4.9932,0)
ESC
CONIC MODE: POL MAN
CONIC GRAPHING APP

Cartesian Hyperbola

1.

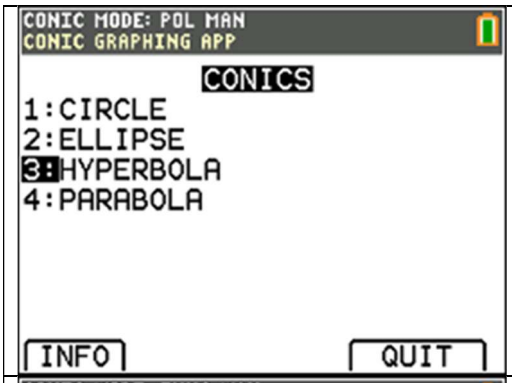
The top and base of an opaque truncated cone lamp shade are 14 cm and 18 cm in diameter respectively. The light bulb is located at the center of the shade 13 cm fro the top. It casts a shadow, which is of the form of a hyperbola, on a wall touched by the base of the lampshade. Assume the origin is at the light bulb and evaluate the vertices, foci, and the slope of the asymptotes of the hyperbola. Draw the hyperbola.

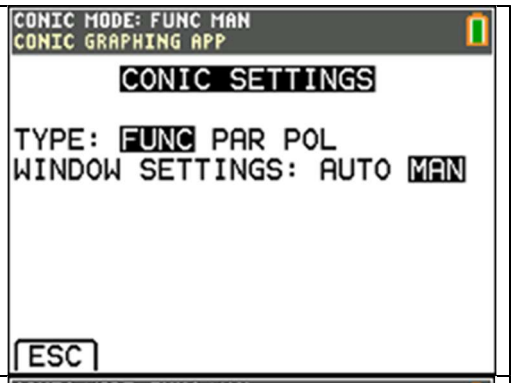


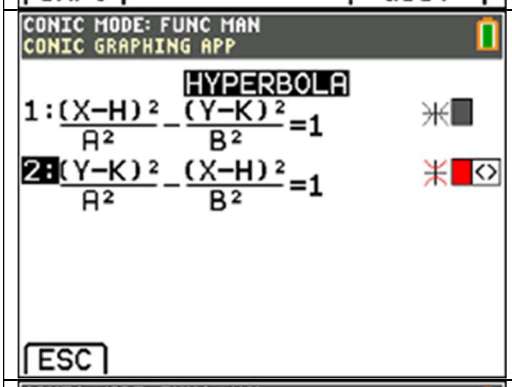


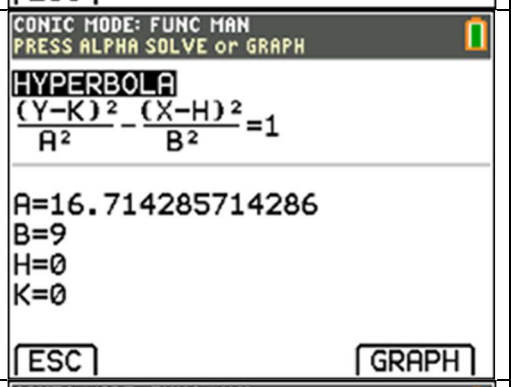
$x^2+z^2=\frac{y^2}{c^2}$	$x^2+z^2=\frac{y^2}{c^2}$
$0\rightarrow x$	0
$13\rightarrow y$	13
$7\rightarrow z$	7
$\text{solve}\left(x^2+z^2=\frac{y^2}{2},c\right)$	$c=\frac{-13}{7}$ or $c=\frac{13}{7}$

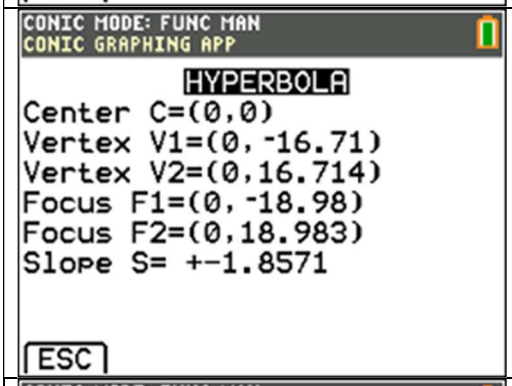
$x^2+9^2=\frac{7^2}{13^2}\cdot y^2$	$x^2+81=\frac{49\cdot y^2}{169}$
$1=\frac{7^2\cdot y^2}{13^2\cdot 9^2}-\frac{x^2}{9^2}$	$1=\frac{49\cdot y^2}{13689}-\frac{x^2}{81}$

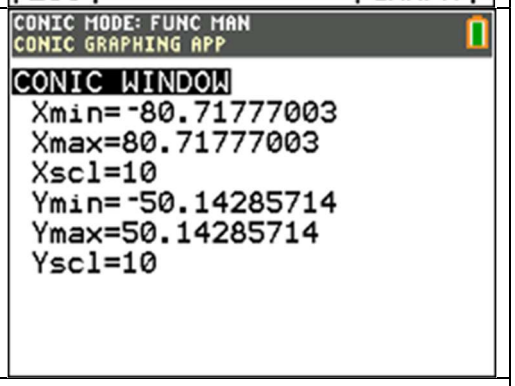

CONIC MODE: POL MAN
CONIC GRAPHING APP
CONICS
1:CIRCLE
2:ELLIPSE
3:HYPERBOLA
4:PARABOLA
INFO
QUIT

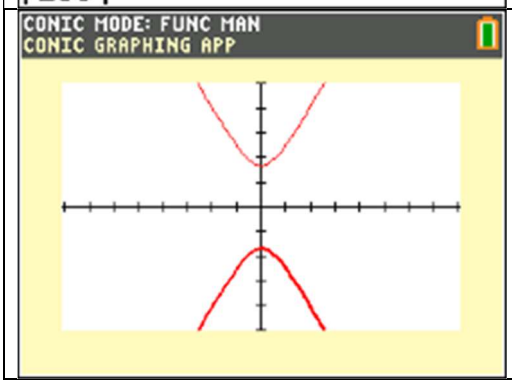

CONIC MODE: FUNC MAN
CONIC GRAPHING APP
CONIC SETTINGS
TYPE: FUNC PAR POL
WINDOW SETTINGS: AUTO MAN
ESC


CONIC MODE: FUNC MAN
CONIC GRAPHING APP
HYPERBOLA
1:(X-H)²/A² - (Y-K)²/B² =1
2:(Y-K)²/A² - (X-H)²/B² =1
ESC


CONIC MODE: FUNC MAN
PRESS ALPHA SOLVE or GRAPH
HYPERBOLA
(Y-K)²/A² - (X-H)²/B² =1
A=16.714285714286
B=9
H=0
K=0
ESC
GRAPH

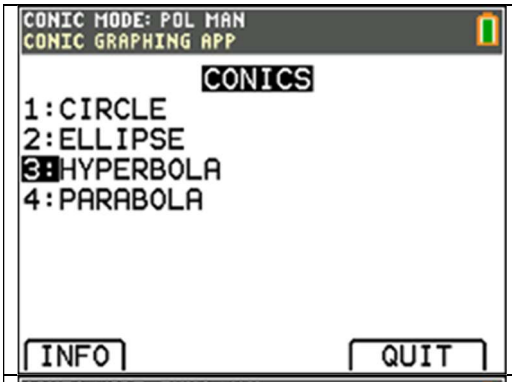

CONIC MODE: FUNC MAN
CONIC GRAPHING APP
HYPERBOLA
Center C=(0,0)
Vertex V1=(0,-16.71)
Vertex V2=(0,16.714)
Focus F1=(0,-18.98)
Focus F2=(0,18.983)
Slope S= +-1.8571
ESC

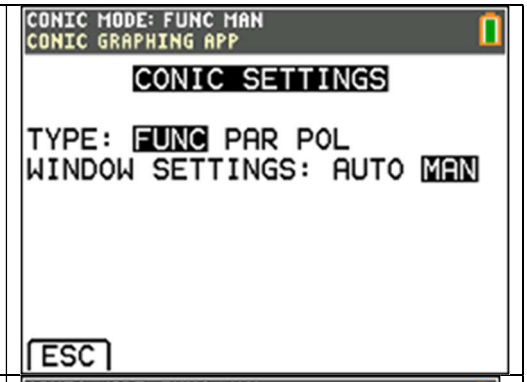

CONIC MODE: FUNC MAN
CONIC GRAPHING APP
CONIC WINDOW
Xmin=-80.71777003
Xmax=80.71777003
Xscl=10
Ymin=-50.14285714
Ymax=50.14285714
Yscl=10

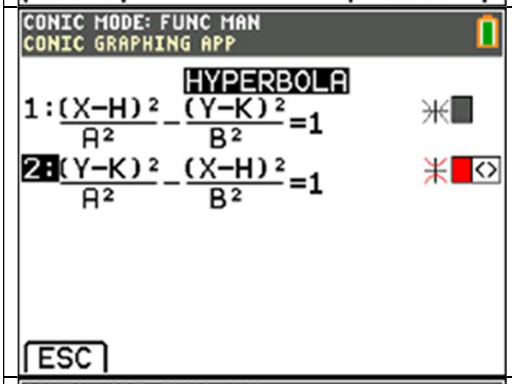

CONIC MODE: FUNC MAN
CONIC GRAPHING APP

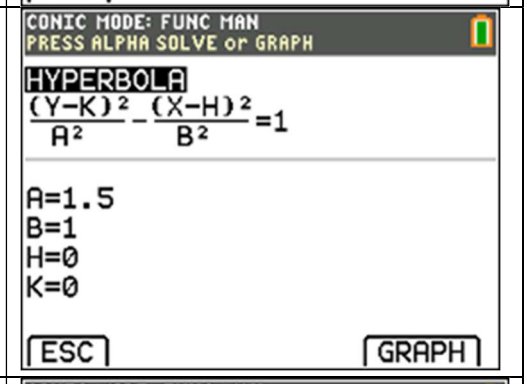
2.

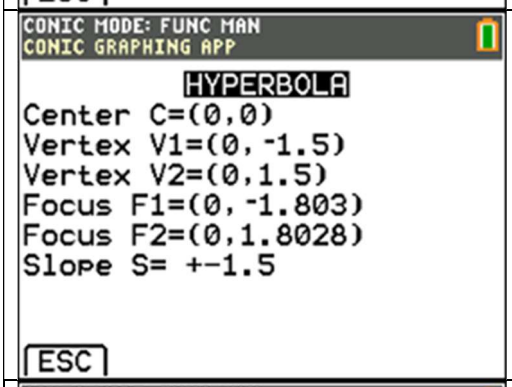
A lamp with an opaque cylindrical shade 0.5m in diameter, 0.75m high has a light bulb located at the center of the shade. It casts a shadow, which is of the form of a hyperbola, on a wall 1m from the bulb and parallel to the shade. Assume the origin is at the light bulb. Evaluate the vertices, foci, and the slope of the asymptotes of the hyperbola.

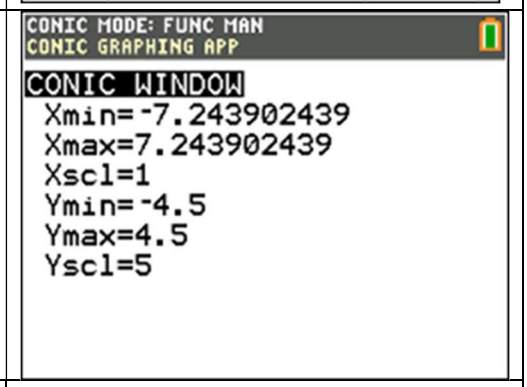


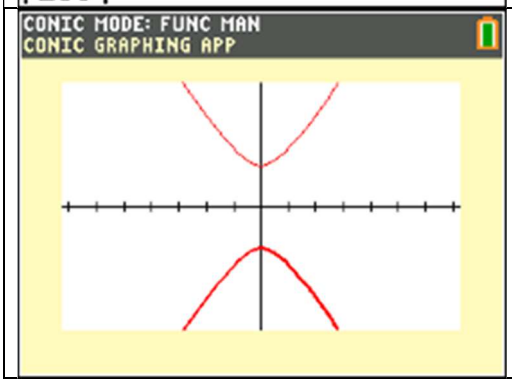




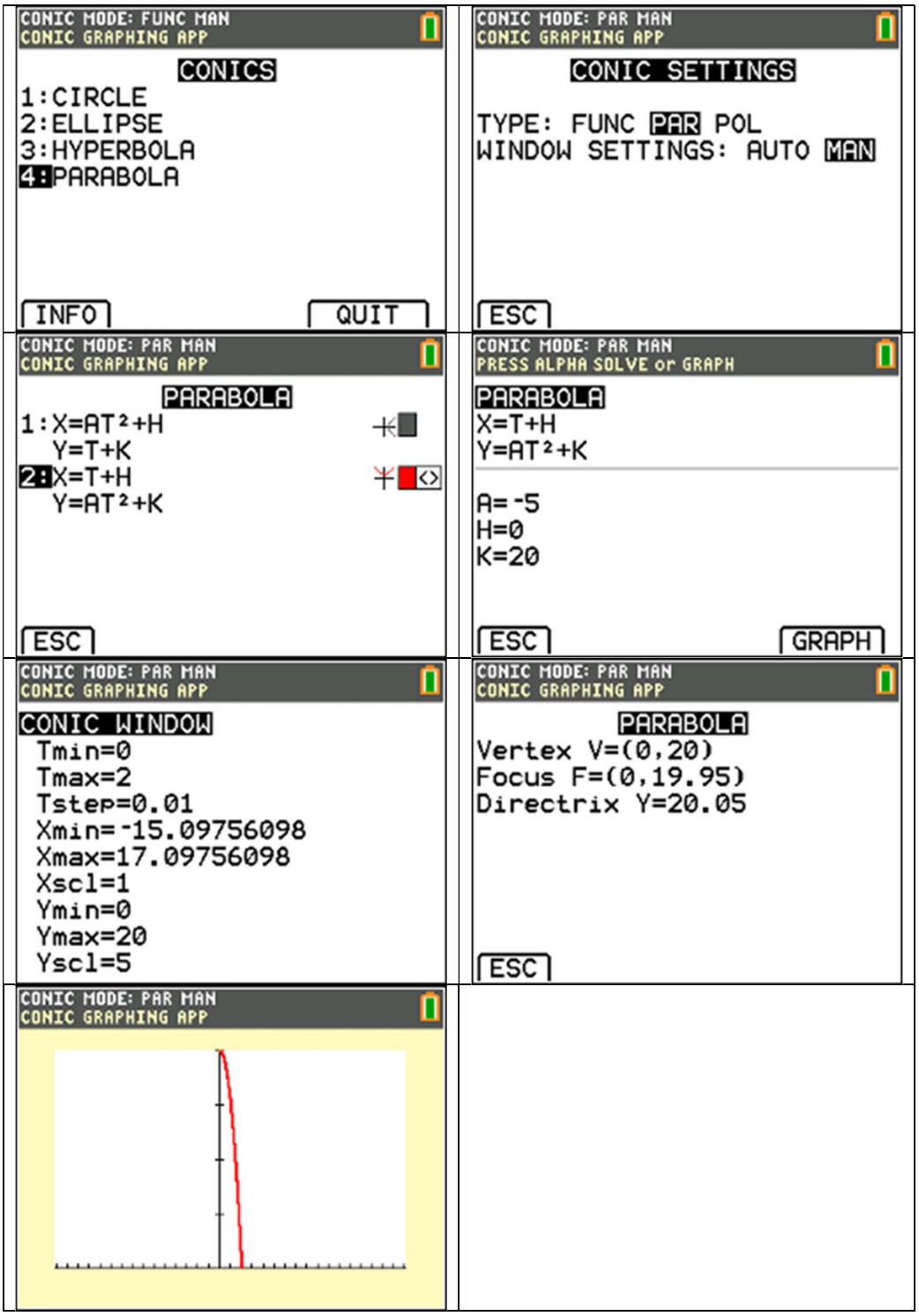








Parametric Parabola

Assume a ball is thrown horizontally with a speed of 1 ms^{-1} from a height of 20 m (g = 10 ms^{-2}).

Determine the vertex, focus and directrix of the path of the projectile (parabola).