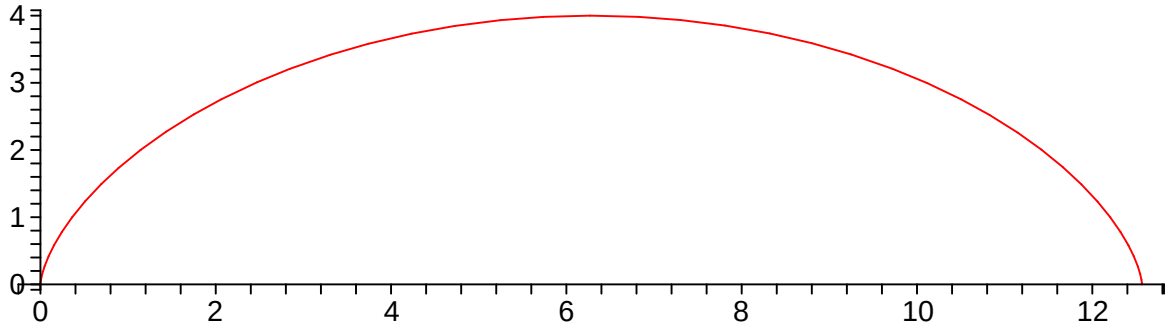
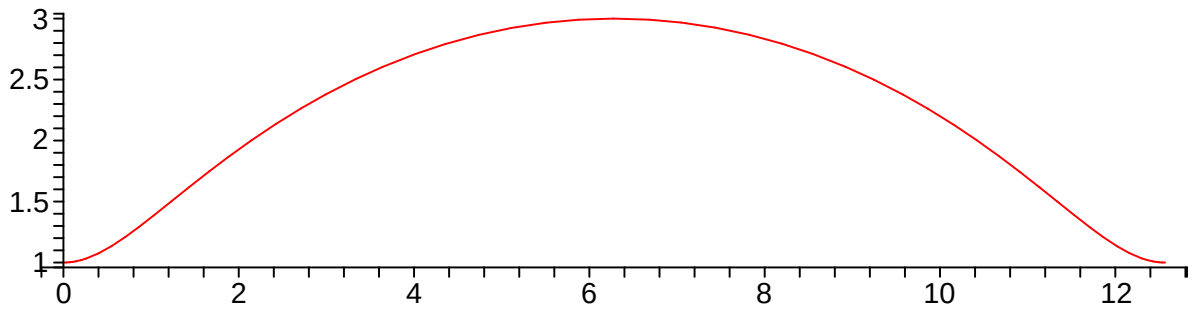
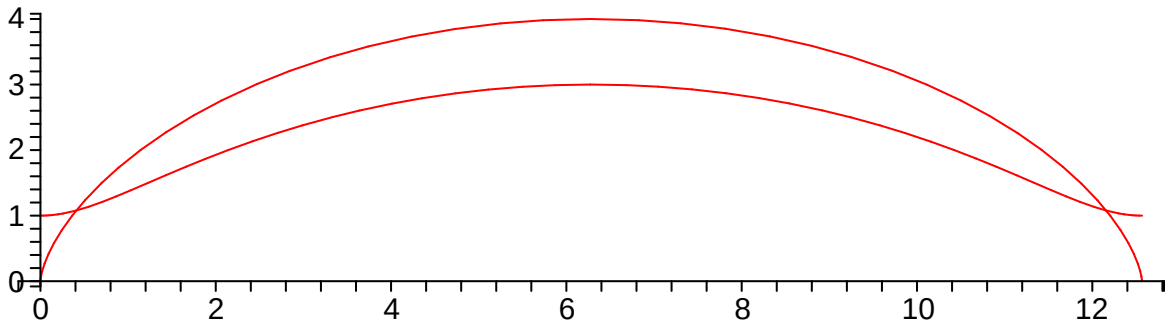
```
> restart;
> with(plots):
```
Warning, the name changecoords has been redefined
```
> x:=a*(t-sin(t));
```
$$x := a\,(t - \sin(t))$$
```
> y:=a*(1-cos(t));
```
$$y := a\,(1 - \cos(t))$$
```
> a:=2;
```
$$a := 2$$
```
> P1:=plot([x,y,t=0..2*Pi]):
  display(P1);
```


```
> a:='a';
```
$$a := a$$
```
> x2:=a*(t-(1/2)*sin(t));
  y2:=a*(1-(1/2)*cos(t));
```
$$x2 := a\left(t - \frac{1}{2}\sin(t)\right)$$

$$y2 := a\left(1 - \frac{1}{2}\cos(t)\right)$$
```
> a:=2;
```
$$a := 2$$
```
> P2:=plot([x2,y2,t=0..2*Pi]):
  display(P2);
```




```
> display(P1,P2);
```




```
> L2:=a*int(sqrt(5/4-cos(t)),t=0..2*Pi);
```

$$L2 := 12\ \mathrm{EllipticE}\left(\frac{2}{3}\sqrt{2}\right)$$

```
> evalf(L2);
```

$$13.36489322$$

```
> a:='a';
```

$$a := a$$

```
> x3:=(a-c)*cos(t)+c*cos((a-c)/c*t);
  y3:=(a-c)*sin(t)-c*sin((a-c)/c*t);
```

$$x3 := (a - c)\cos(t) + c\cos\left(\frac{(a - c)\,t}{c}\right)$$

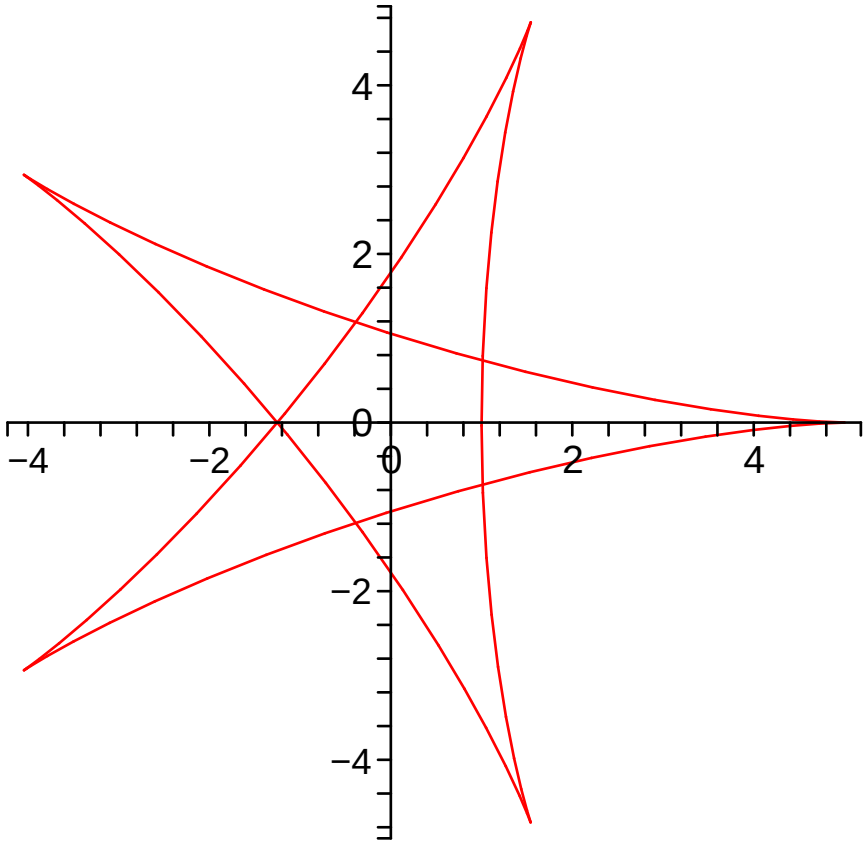
$$y3 := (a - c)\sin(t) - c\sin\left(\frac{(a - c)\,t}{c}\right)$$

```
> a:=5;
  c:=2;
```

$$a := 5$$

$$c := 2$$

```
> plot([x3,y3,t=0..4*Pi]);
```




```
> dx3:=diff(x3,t);
  dy3:=diff(y3,t);
```

$$dx3 := -3\sin(t) - 3\sin\left(\frac{3}{2}t\right)$$

$$dy3 := 3\cos(t) - 3\cos\left(\frac{3}{2}t\right)$$

```
> # Compute only one arc and multiply by 5 to obtain total length
> L:=5*int(sqrt(dx3^2+dy3^2),t=0..4*Pi/5);
```

$$L := 24$$

```
>
```