

Example 4: Plot the curve that is represented parametrically by the equations

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$$x = t^2 \quad \text{and} \quad y = t^6 + 2$$

on the interval $-1 \leq t \leq 2$.

```
> restart ;
```

```
> with(plots) :
```

```
> f := t -> t^2 ;
```

$$f := t \rightarrow t^2$$

(1)

```
> g := t -> t^6 + 2 ;
```

$$g := t \rightarrow t^6 + 2$$

(2)

```
> a := -1 ;
```

$$a := -1$$

(3)

```
> b := 2 ;
```

$$b := 2$$

(4)

```
> Subints := 30 ;
```

$$\text{Subints} := 30$$

(5)

```
> h := (b-a)/Subints ;
```

$$h := \frac{1}{10}$$

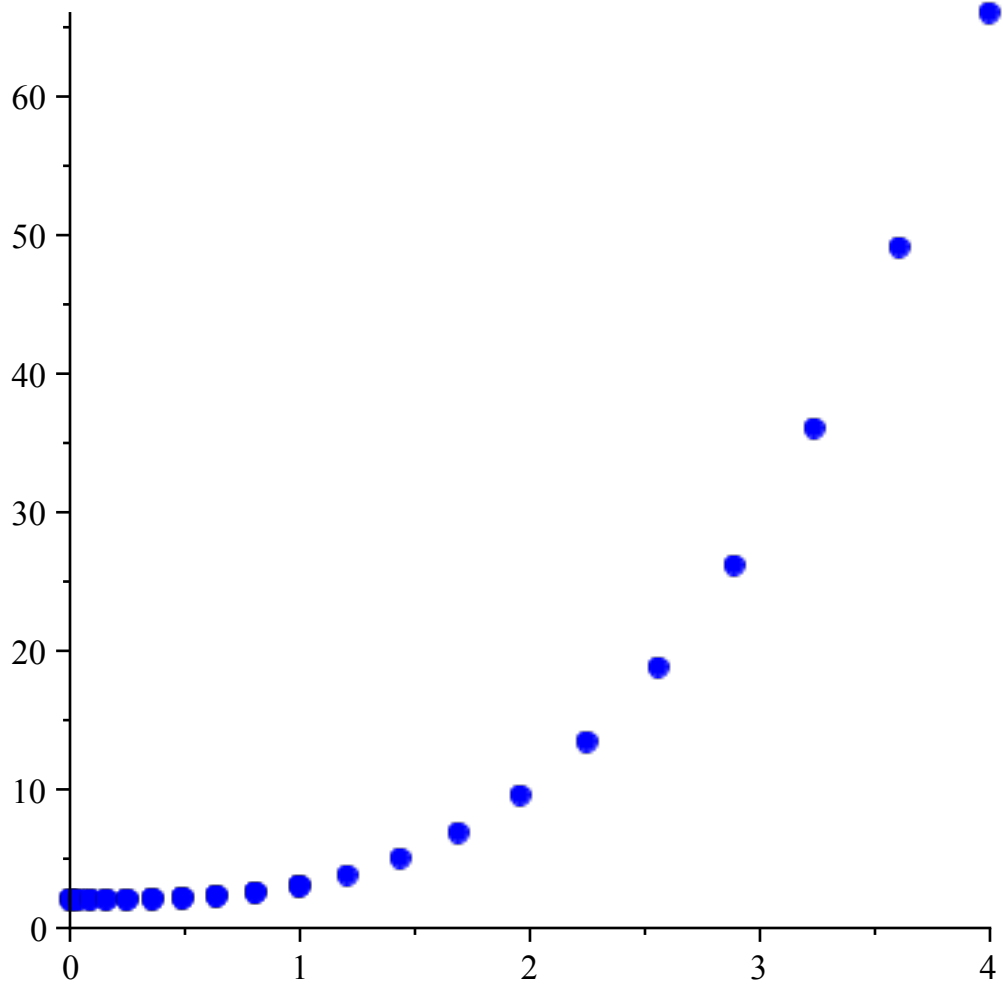
(6)

```
> printf("\n      i      t          x          y\n -----\n\n"):
for i from 0 to Subints do
  T[i] := a + h*i:
  X[i] := f(T[i]):
  Y[i] := g(T[i]):
  printf("   %3d   %7.2f   %12.7f   %12.7f\n", i, T[i], X[i], Y[i])
:
od:
```

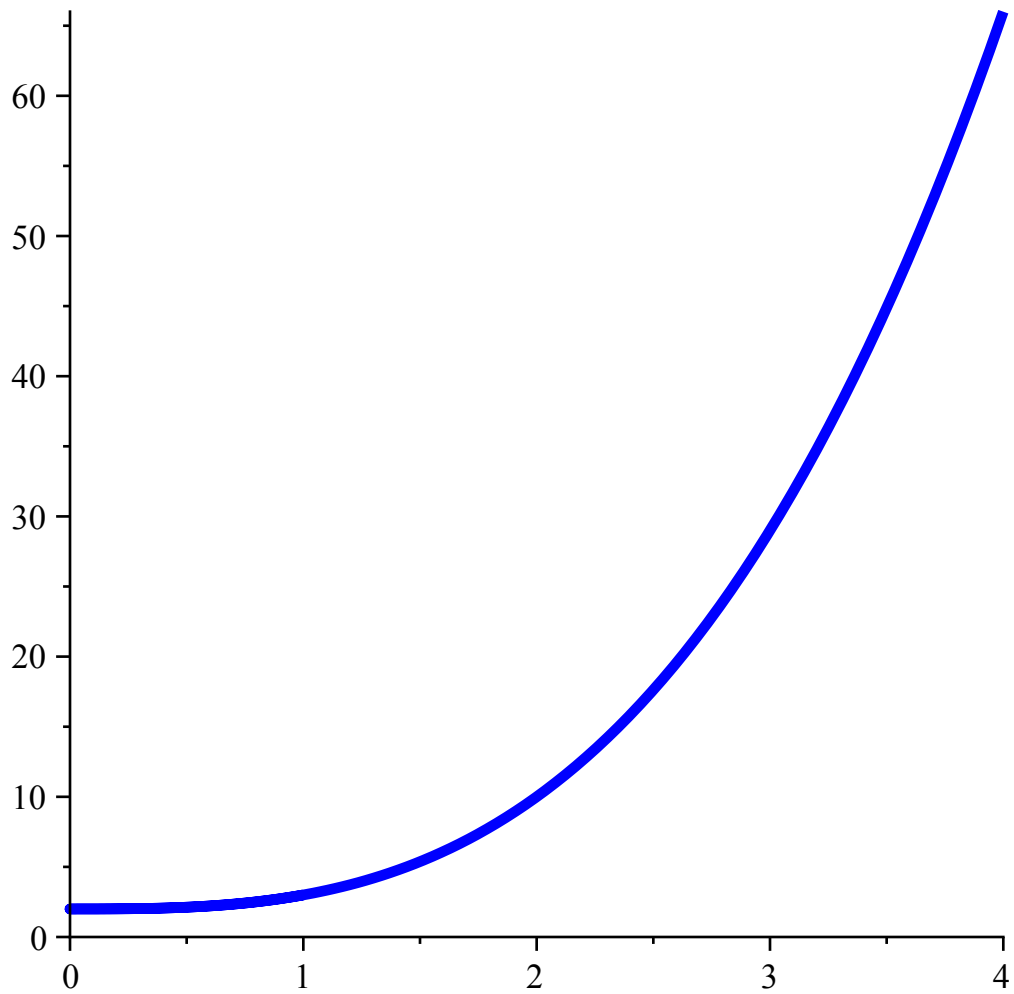
| i | t | x | y |
|---|-------|-----------|-----------|
| 0 | -1.00 | 1.0000000 | 3.0000000 |
| 1 | -0.90 | 0.8100000 | 2.5314410 |
| 2 | -0.80 | 0.6400000 | 2.2621440 |
| 3 | -0.70 | 0.4900000 | 2.1176490 |
| 4 | -0.60 | 0.3600000 | 2.0466560 |
| 5 | -0.50 | 0.2500000 | 2.0156250 |
| 6 | -0.40 | 0.1600000 | 2.0040960 |

```
7 -0.30 0.0900000 2.0007290
8 -0.20 0.0400000 2.0000640
9 -0.10 0.0100000 2.0000010
10 0.00 0.0000000 2.0000000
11 0.10 0.0100000 2.0000010
12 0.20 0.0400000 2.0000640
13 0.30 0.0900000 2.0007290
14 0.40 0.1600000 2.0040960
15 0.50 0.2500000 2.0156250
16 0.60 0.3600000 2.0466560
17 0.70 0.4900000 2.1176490
18 0.80 0.6400000 2.2621440
19 0.90 0.8100000 2.5314410
20 1.00 1.0000000 3.0000000
21 1.10 1.2100000 3.7715610
22 1.20 1.4400000 4.9859840
23 1.30 1.6900000 6.8268090
24 1.40 1.9600000 9.5295360
25 1.50 2.2500000 13.3906250
26 1.60 2.5600000 18.7772160
27 1.70 2.8900000 26.1375690
28 1.80 3.2400000 36.0122240
29 1.90 3.6100000 49.0458810
30 2.00 4.0000000 66.0000000
```

```
> plot( [[ f(T[k]), g(T[k]) ]$k = 0 .. Subints ], style=point,  
symbol=solidcircle, symbolsize=16, color=blue, view=[0..4,0..66]  
);
```



```
> plot( [ f(t), g(t), t = a .. b ], color = blue, thickness = 4,  
view=[0..4,0..66] );
```



Create the animation to see the curve's growth and its direction:

```
> animatecurve([ f(t),g(t), t = a .. b], frames=50, color=blue,  
  thickness=4, numpoints=200, view=[0..4,0..66] );
```