> $\#S(x):=\begin{cases} a1+b1\cdot(x-x1)+c1\cdot(x-x1)^2+d1\cdot(x-x1)^3, x<x1 \\ a2+b2\cdot(x-x2)+c2\cdot(x-x2)^2+d2\cdot(x-x2)^3, x<x2 \\ \ldots \\ an+bn\cdot(x-xn)+cn\cdot(x-xn)^2+dn\cdot(x-xn)^3, x<xn \end{cases}$

>

> *restart*;

> $t0 := -7;$

$$t0 := -7 \quad (1)$$

> $t1 := 1;$

$$t1 := 1 \quad (2)$$

> $t2 := 9;$

$$t2 := 9 \quad (3)$$

> $t3 := 17;$

$$t3 := 17 \quad (4)$$

> $p0 := -4.3;$

$$p0 := -4.3 \quad (5)$$

> $p1 := 2.1;$

$$p1 := 2.1 \quad (6)$$

> $p2 := 8.8;$

$$p2 := 8.8 \quad (7)$$

> $p3 := 11.5;$

$$p3 := 11.5 \quad (8)$$

> $\#S(x) := \begin{cases} a1+b1\cdot(x-1)+c1\cdot(x-1)^2+d1\cdot(x-1)^3, x<1 \\ a1+b1\cdot(x-9)+c1\cdot(x-9)^2+d1\cdot(x-9)^3, x<9 \\ a1+b1\cdot(x-17)+c1\cdot(x-17)^2+d1\cdot(x-17)^3, x<17 \end{cases}$

> $h1 := t1 - t0;$

$$h1 := 8 \quad (9)$$

> $h2 := t2 - t1;$

$$h2 := 8 \quad (10)$$

> $h3 := t3 - t2;$

$$h3 := 8 \quad (11)$$

> #

$$a0 = p0$$

$$a1 = p1$$

$$a2 = p2$$

$$a3 = p3$$

$$d1 = \frac{c1}{3 \cdot h1}$$

$$d2 = \frac{c2 - c1}{3 \cdot h2}$$

$$d3 = \frac{c3 - c2}{3 \cdot h3}$$

$$b1 = \frac{a1 - a0}{h1} + \frac{2 \cdot c1}{3} \cdot h1$$

$$b2 = \frac{a2 - a1}{h2} + \frac{2 \cdot c2 + c1}{3} \cdot h2$$

$$b3 = \frac{a3 - a2}{h3} + \frac{c2}{3} \cdot h2$$

$$2 \cdot c1 \cdot (h1 + h2) + c2 \cdot h2 = 3 \cdot \left(\frac{a2 - a1}{h2} - \frac{a1 - a0}{h1} \right); c1 \cdot h2 + 2 \cdot c2 \cdot (h2 + h3) = 3 \cdot \left(\frac{a3 - a2}{h3} - \frac{a2}{} \right.$$

> $a0 := p0;$

$$a0 := -4.3 \quad \textbf{(12)}$$

> $a1 := p1;$

$$a1 := 2.1 \quad \textbf{(13)}$$

> $a2 := p2;$

$$a2 := 8.8 \quad \textbf{(14)}$$

> $a3 := p3;$

$$a3 := 11.5 \quad \textbf{(15)}$$

> $solve\left(\left\{ 2 \cdot c1 \cdot (h1 + h2) + c2 \cdot h2 = 3 \cdot \left(\frac{a2 - a1}{h2} - \frac{a1 - a0}{h1} \right), c1 \cdot h2 + 2 \cdot c2 \cdot (h2 + h3) = 3 \cdot \left(\frac{a3 - a2}{h3} - \frac{a2 - a1}{h2} \right) \right\}, \{c1, c2\} \right);$

$$\{c1 = 0.01625000000, c2 = -0.05093750000\} \quad \textbf{(16)}$$

> $c1 := 0.01625000000;$

$$c1 := 0.01625000000 \quad \textbf{(17)}$$

> $b1 := \frac{a1 - a0}{h1} + \frac{2 \cdot c1}{3} \cdot h1;$

$$b1 := 0.8866666667 \quad \textbf{(18)}$$

> $c2 := -0.05093750000;$

$$c2 := -0.05093750000 \quad \textbf{(19)}$$

```
>
> b2 := (a2 - a1)/h2 + (2·c2 + c1)/3 · h2
```

$$b2 := 0.6091666667 \tag{20}$$

```
> b3 := (a3 - a2)/h3 + c2/3 · h2;
```

$$b3 := 0.2016666667 \tag{21}$$

```
> d1 := c1/(3·h1);
```

$$d1 := 0.0006770833333 \tag{22}$$

```
> d2 := (c2 - c1)/(3·h2);
```

$$d2 := -0.002799479167 \tag{23}$$

```
> d3 := -c2/(3·h3);
```

$$d3 := 0.002122395833 \tag{24}$$

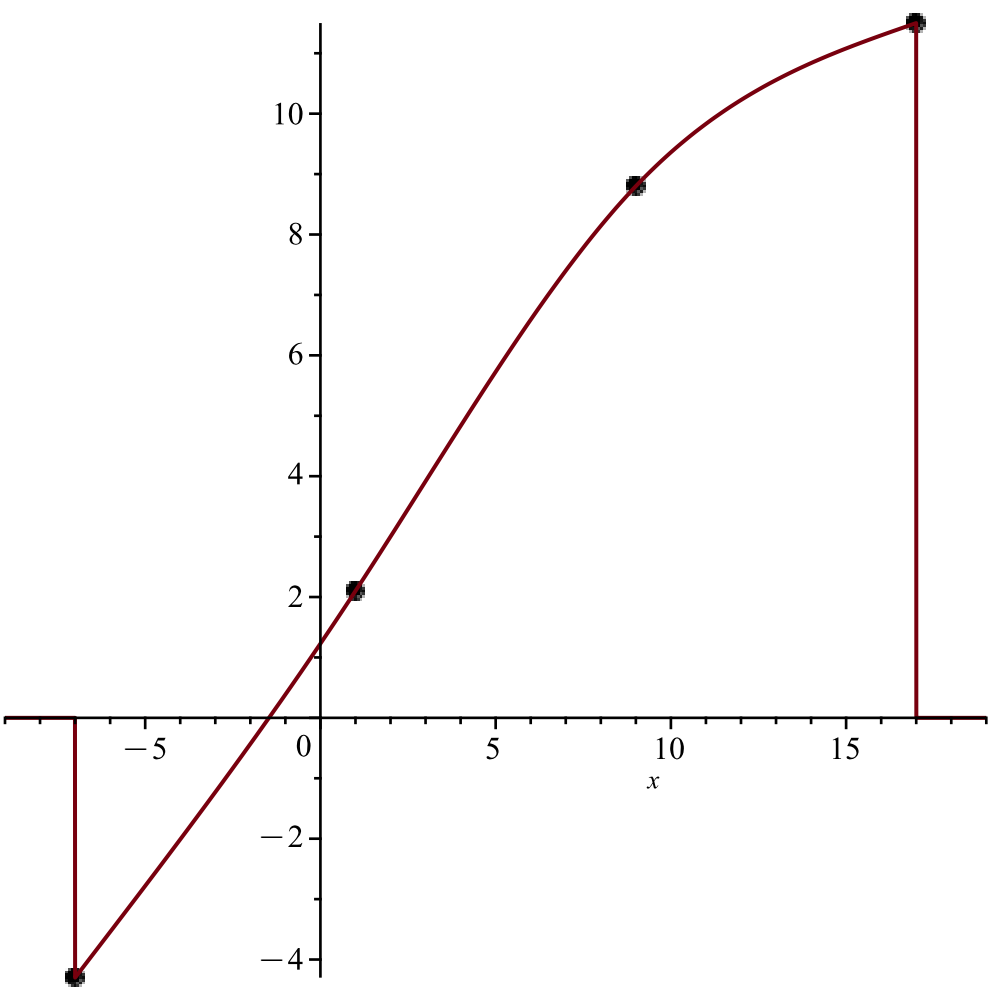
```
> S(x) := piecewise(-7 ≤ x < 1, expand(a1 + b1·(x - 1) + c1·(x - 1)^2 + d1·(x - 1)^3), 1
    ≤ x < 9, expand(a2 + b2·(x - 9) + c2·(x - 9)^2 + d2·(x - 9)^3), 9 ≤ x < 17,
  expand(a3 + b3·(x - 17) + d3·(x - 17)^3))
```

$$S := x \mapsto \begin{cases} expand(a1 + b1\cdot(x-1) + c1\cdot(x-1)^2 + d1\cdot(x-1)^3) & -7 \le x < 1 \\ expand(a2 + b2\cdot(x-9) + c2\cdot(x-9)^2 + d2\cdot(x-9)^3) & 1 \le x < 9 \\ expand(a3 + b3\cdot(x-17) + d3\cdot(x-17)^3) & 9 \le x < 17 \end{cases} \tag{25}$$

```
> S(x);
```

$$\begin{cases} 1.228906250 + 0.8561979167\,x + 0.01421875000\,x^2 + 0.0006770833333\,x^3 & -7 \le x < 1 \\ 1.232382813 + 0.8457682291\,x + 0.02464843751\,x^2 - 0.002799479167\,x^3 & 1 \le x < 9 \\ -2.355664064 + 2.041783854\,x + 0.002122395833\,x^3 - 0.1082421875\,x^2 & 9 \le x < 17 \end{cases} \tag{26}$$

```
>
> with(plots):
> p1 := pointplot([[t0, p0], [t1, p1], [t2, p2], [t3, p3]], symbol = solidcircle, symbolsize = 15):
> p2 := plot(S(x), x = -9..19):
> display([p1, p2]);
```


10
8
6
4
2
−2
−4
−5
0
5
10
15
x