>

> $base := x \rightarrow \dfrac{(x-5)^2}{2} - 5;$

$$base := x \rightarrow \frac{1}{2}(x-5)^2 - 5 \tag{1}$$

> $plot(base(x), x = 0..10);$
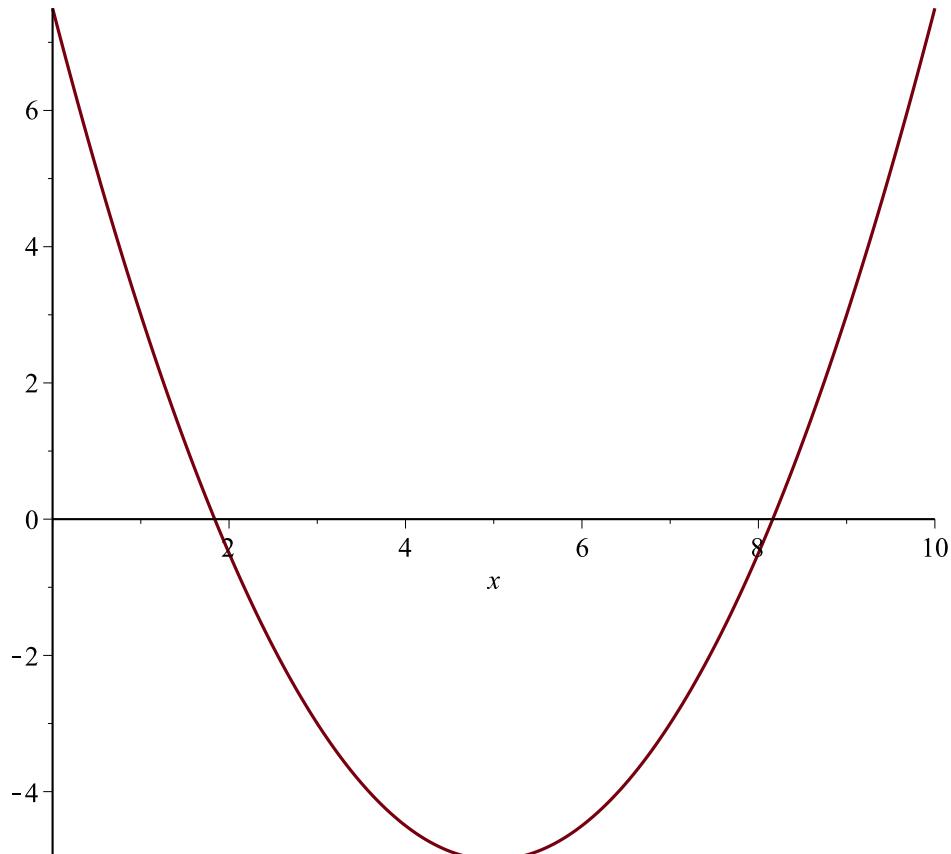
> $[0, base(0)], [1, base(1)], ... [7, b], [8, base(8)], ...$

$$\left[0, \frac{15}{2}\right], [1, 3], ( )..[7, b], \left[8, -\frac{1}{2}\right], ( )..( ) \tag{2}$$

> $parabpt := [seq([i, base(i)], i = 0..10)];$

$$parabpt := \left[\left[0, \frac{15}{2}\right], [1, 3], \left[2, -\frac{1}{2}\right], [3, -3], \left[4, -\frac{9}{2}\right], [5, -5], \left[6, -\frac{9}{2}\right], [7, -3], \left[8, \right.\right.$$
$$\left.\left.-\frac{1}{2}\right], [9, 3], \left[10, \frac{15}{2}\right]\right] \tag{3}$$

> $parabpt[1..7], [7, b], parabpt[9..11];$

$$\tag{4}$$

$$\left[\left[0, \frac{15}{2}\right], [1, 3], \left[2, -\frac{1}{2}\right], [3, -3], \left[4, -\frac{9}{2}\right], [5, -5], \left[6, -\frac{9}{2}\right]\right], [7, b], \left[\left[8, -\frac{1}{2}\right], [9, 3],\right. \tag{4}$$
$$\left.\left[10, \frac{15}{2}\right]\right]$$

> $[\ op(parabpt[1..7]), [7, b], op(parabpt[9..11])\ ];$
$$\left[\left[0, \frac{15}{2}\right], [1, 3], \left[2, -\frac{1}{2}\right], [3, -3], \left[4, -\frac{9}{2}\right], [5, -5], \left[6, -\frac{9}{2}\right], [7, b], \left[8, -\frac{1}{2}\right], [9, 3],\right. \tag{5}$$
$$\left.\left[10, \frac{15}{2}\right]\right]$$

> $[seq([i, base(i)], i=0..6), [7, b], seq([i, base(i)], i=8..10)]$
$$\left[\left[0, \frac{15}{2}\right], [1, 3], \left[2, -\frac{1}{2}\right], [3, -3], \left[4, -\frac{9}{2}\right], [5, -5], \left[6, -\frac{9}{2}\right], [7, b], \left[8, -\frac{1}{2}\right], [9, 3],\right. \tag{6}$$
$$\left.\left[10, \frac{15}{2}\right]\right]$$

> $pdata := b \rightarrow [seq([i, base(i)], i=0..6), [7, b], seq([i, base(i)], i=8..10)];$
$$pdata := b \rightarrow [seq([i, base(i)], i=0..6), [7, b], seq([i, base(i)], i=8..10)] \tag{7}$$

> $pdata(200000000);$
$$\left[\left[0, \frac{15}{2}\right], [1, 3], \left[2, -\frac{1}{2}\right], [3, -3], \left[4, -\frac{9}{2}\right], [5, -5], \left[6, -\frac{9}{2}\right], [7, 200000000], \left[8, -\frac{1}{2}\right],\right. \tag{8}$$
$$\left.[9, 3], \left[10, \frac{15}{2}\right]\right]$$

> $with(CurveFitting);$
$$[ArrayInterpolation, BSpline, BSplineCurve, Interactive, LeastSquares, \tag{9}$$
$$PolynomialInterpolation, RationalInterpolation, Spline, ThieleInterpolation]$$

> $PolynomialInterpolation(pdata(-3), x);$
$$\frac{1}{2}x^2 - 5x + \frac{15}{2} \tag{10}$$

> $PolynomialInterpolation(pdata(-2), x);$
$$-\frac{1}{30240}x^{10} + \frac{1}{630}x^9 - \frac{41}{1260}x^8 + \frac{1877}{5040}x^7 - \frac{1253}{480}x^6 + \frac{8321}{720}x^5 - \frac{242639}{7560}x^4 \tag{11}$$
$$+ \frac{22439}{420}x^3 - \frac{1985}{42}x^2 + \frac{85}{7}x + \frac{15}{2}$$

> $plot([pdata(-2), PolynomialInterpolation(pdata(-2), x), PolynomialInterpolation(pdata(-3), x)], x=0..10, style=[point, line, line], symbolsize=24);$
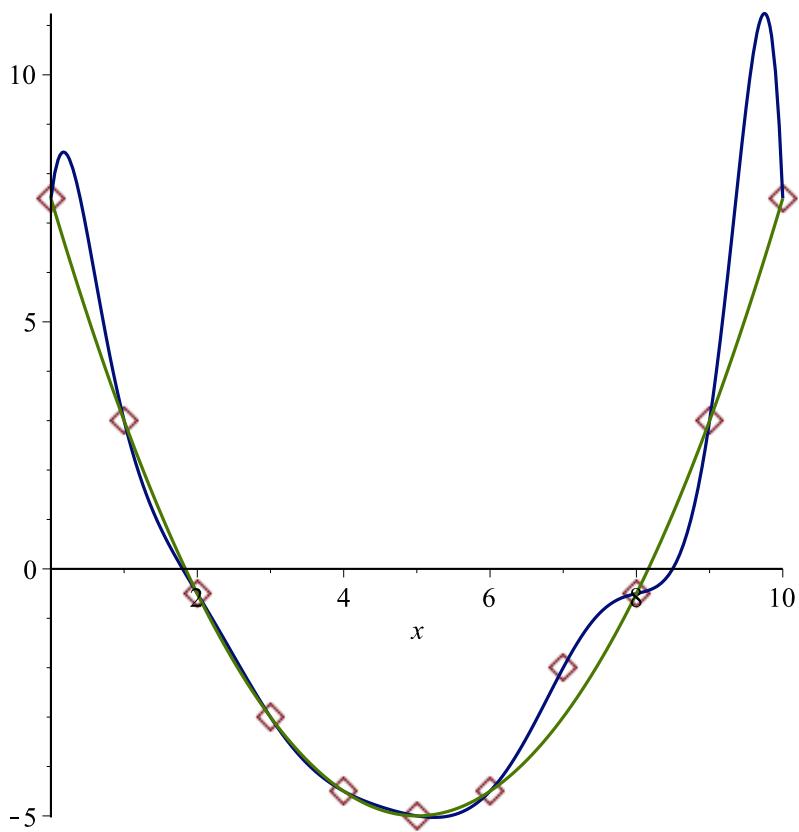
> $PolynomialInterpolation(pdata(b), x);$

$$\frac{15}{2} + \left(-\frac{1}{10080} - \frac{1}{30240}\,b\right)x^{10} + \left(\frac{1}{210} + \frac{1}{630}\,b\right)x^9 + \left(-\frac{41}{420} - \frac{41}{1260}\,b\right)x^8 \qquad (12)$$
$$+ \left(\frac{1877}{5040}\,b + \frac{1877}{1680}\right)x^7 + \left(-\frac{1253}{480}\,b - \frac{1253}{160}\right)x^6 + \left(\frac{8321}{240} + \frac{8321}{720}\,b\right)x^5 + \Bigg($$
$$-\frac{242639}{2520} - \frac{242639}{7560}\,b\Bigg)x^4 + \left(\frac{22439}{140} + \frac{22439}{420}\,b\right)x^3 + \left(-\frac{1999}{14} - \frac{1003}{21}\,b\right)x^2$$
$$+ \left(\frac{120}{7}\,b + \frac{325}{7}\right)x$$

> $f := b \rightarrow PolynomialInterpolation(pdata(b), x);$

$$f := b \rightarrow CurveFitting:-PolynomialInterpolation(pdata(b), x) \qquad (13)$$

> $f(3);$

$$-\frac{1}{5040}x^{10} + \frac{1}{105}x^9 - \frac{41}{210}x^8 + \frac{1877}{840}x^7 - \frac{1253}{80}x^6 + \frac{8321}{120}x^5 - \frac{242639}{1260}x^4 \qquad (14)$$
$$+ \frac{22439}{70}x^3 - \frac{4005}{14}x^2 + \frac{685}{7}x + \frac{15}{2}$$

> $plot(f(4), x = -0..10);$
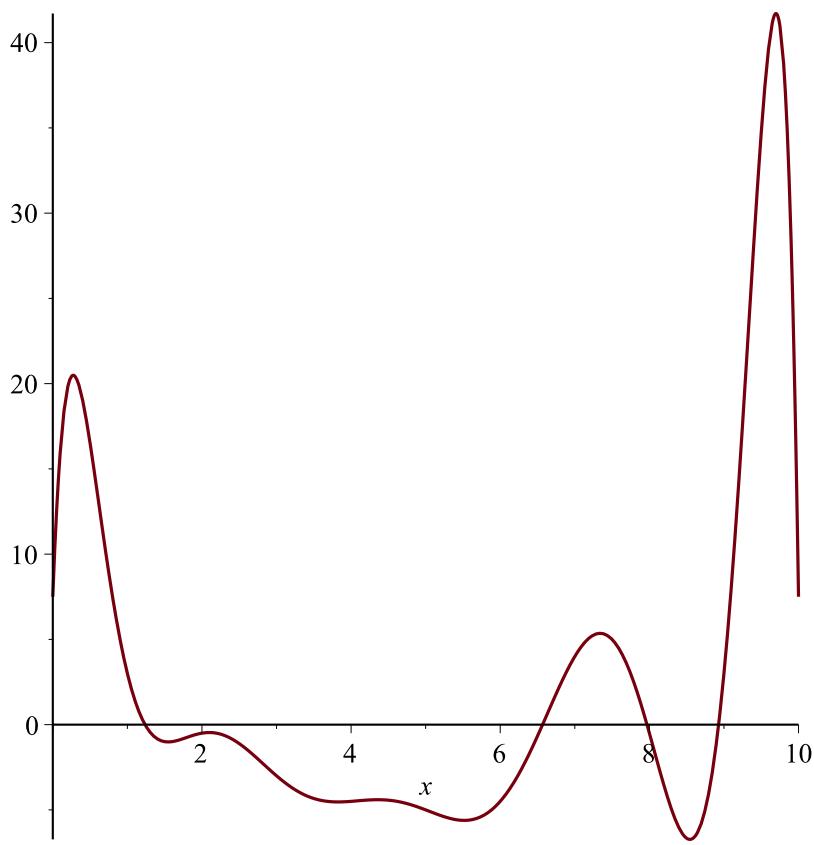
> $eff := unapply(PolynomialInterpolation(pdata(b), x), b);$

$$eff := b \rightarrow \frac{15}{2} + \left(-\frac{1}{10080} - \frac{1}{30240}\, b\right) x^{10} + \left(\frac{1}{210} + \frac{1}{630}\, b\right) x^9 + \left(-\frac{41}{420}\right.$$ **(15)**

$$\left. -\frac{41}{1260}\, b\right) x^8 + \left(\frac{1877}{5040}\, b + \frac{1877}{1680}\right) x^7 + \left(-\frac{1253}{480}\, b - \frac{1253}{160}\right) x^6 + \left(\frac{8321}{240}\right.$$

$$\left. +\frac{8321}{720}\, b\right) x^5 + \left(-\frac{242639}{2520} - \frac{242639}{7560}\, b\right) x^4 + \left(\frac{22439}{140} + \frac{22439}{420}\, b\right) x^3 + \left(-\frac{1999}{14}\right.$$

$$\left. -\frac{1003}{21}\, b\right) x^2 + \left(\frac{120}{7}\, b + \frac{325}{7}\right) x$$

> $plot(eff(2), x = 0..10);$
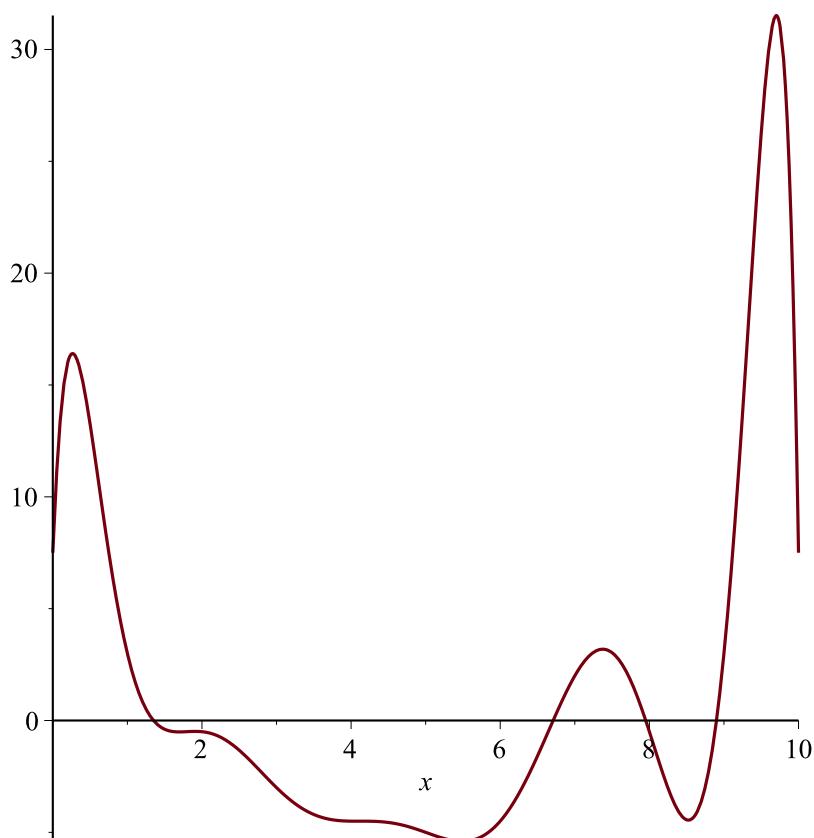
> $pl := b \rightarrow plot(\textit{eff}(b), x = 0..10);$

$$pl := b \rightarrow plot(\textit{eff}(b), x = 0..10) \qquad \textbf{(16)}$$
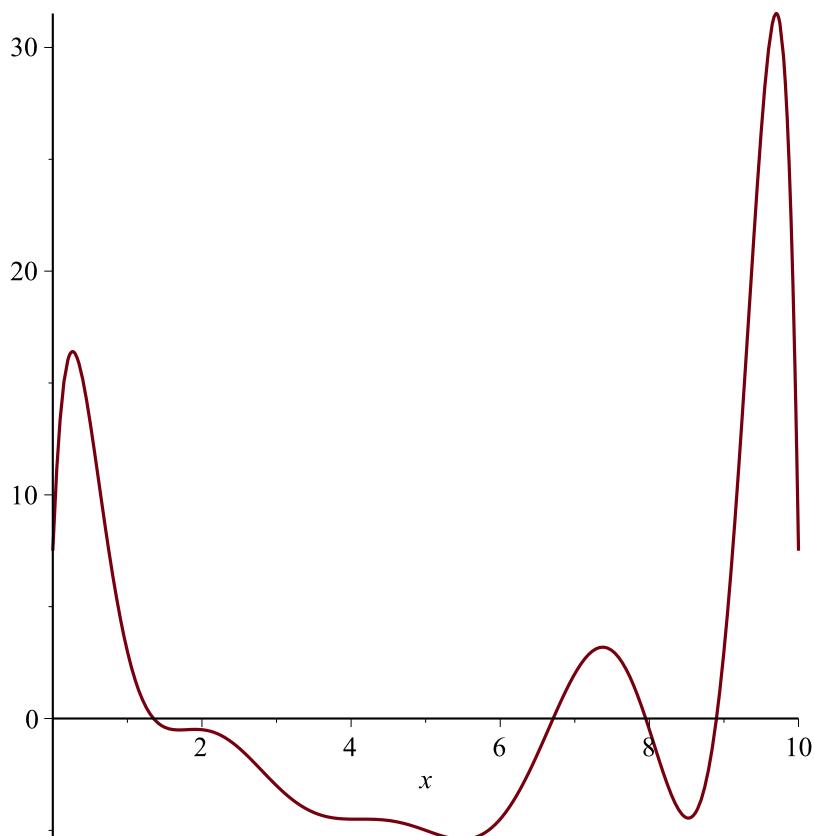
> $pl(2);$

> $pl := b \rightarrow plot([pdata(b), eff(b), eff(-3)], x = 0 ..10, style = [point, line, line], symbolsize = 24);$

$pl := b \rightarrow plot([pdata(b), eff(b), eff(-3)], x = 0 ..10, style = [point, line, line], symbolsize = 24)$ **(17)**

> $pl(2);$
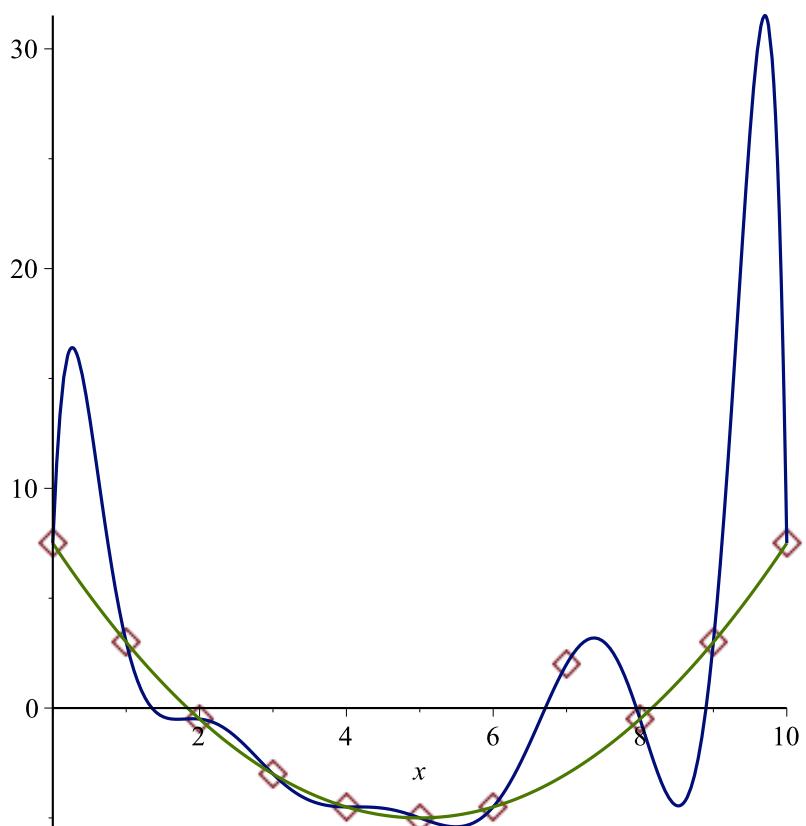
> $pl(-4)$;
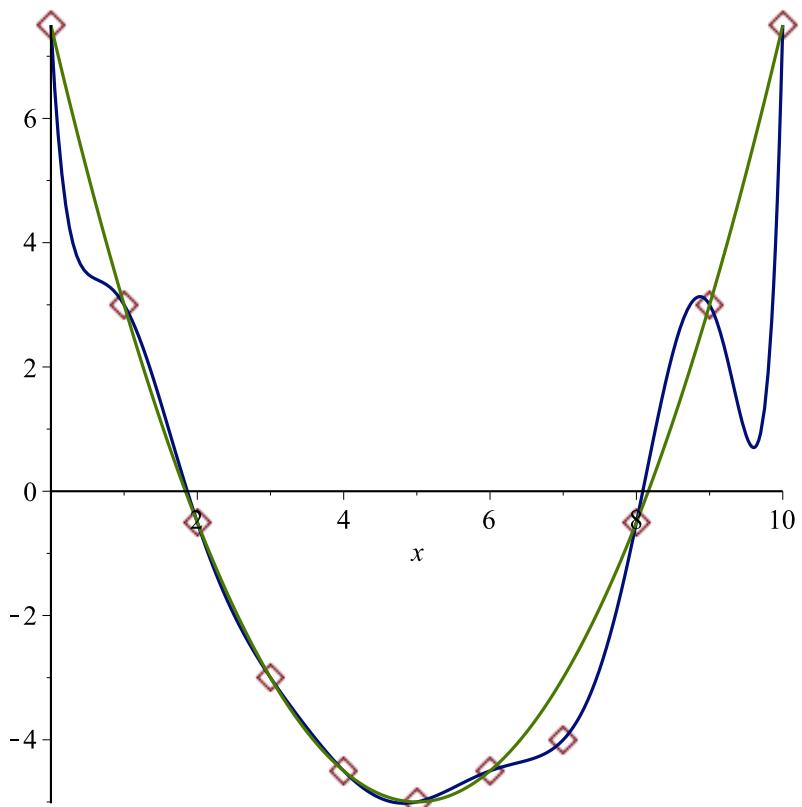
put it all together:

> $base := x \rightarrow \dfrac{(x-5)^2}{2} - 5 :$

$pdata := b \rightarrow [\,seq(\,[\,i, base(i)\,]\,, i = 0\,..6), [7, b], seq(\,[\,i, base(i)\,]\,, i = 8\,..10)\,] :$
$f := b \rightarrow PolynomialInterpolation(\,pdata(b), x\,) :$
$pl := b \rightarrow plot(\,[\,pdata(b), eff(b), eff(-3)\,], x = 0\,..10, style = [\,point, line, line], symbolsize$
$\quad = 24) :$

> $pl(2);$
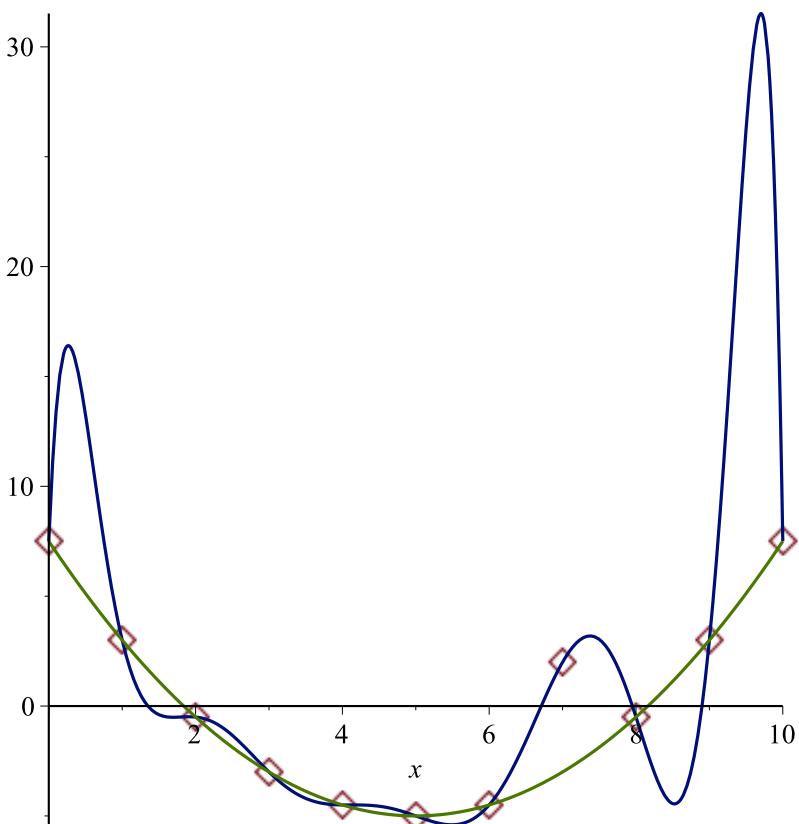
> $pl := b \rightarrow plot([pdata(b), eff(b), eff(-3)], x = 0..10, y = -10..15, style = [point, line, line],$
$symbolsize = 24)$;

$pl := b \rightarrow plot([pdata(b), eff(b), eff(-3)], x = 0..10, y = -10..15, style = [point, line, line],$ **(18)**
$symbolsize = 24)$

>

insert table from menu, click, insert plot from components, insert slider from components. right click to make stuff do goodness.

Put $Do(\%Plot0 = pl(\%Slider0))$;   **in** *the slider.*

$-0.000129\,x^{10} + 0.00620\,x^9 - 0.127\,x^8 + 1.46\,x^7 - 10.2\,x^6 + 45.2\,x^5$
$\quad - 125.\,x^4 + 209.\,x^3 - 187.\,x^2 + 62.2\,x + 7.50$