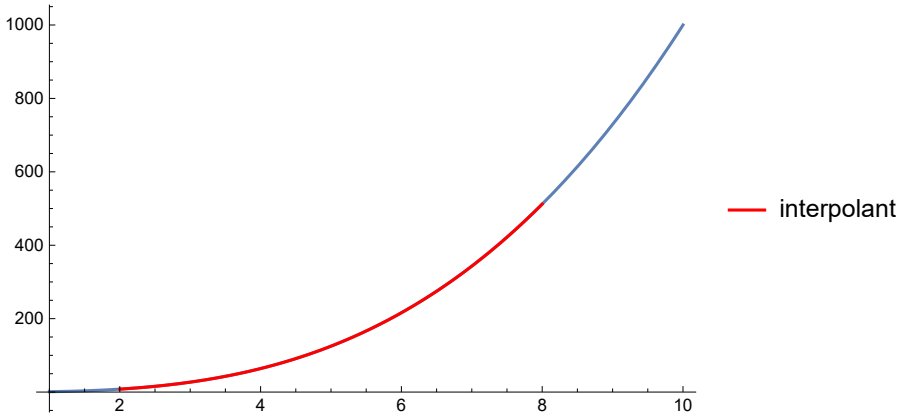
Lagrange interpolation
KZ

```
fun[fun_, x0_, h_, n_] := Module[{x1 = {}, x}, x = x0;
  Do[AppendTo[x1, x];
   x += h, n + 1];
  Product[(t - i + 1), {i, 1, n + 1}]/n! *
   Sum[(-1)^(n-k) Binomial[n, k]/(t - k) fun[x1[[k]]], {k, 1, n + 1}]]
```

Test 1

```
pol = fun[#^3 &, 1, 1, 3];
```

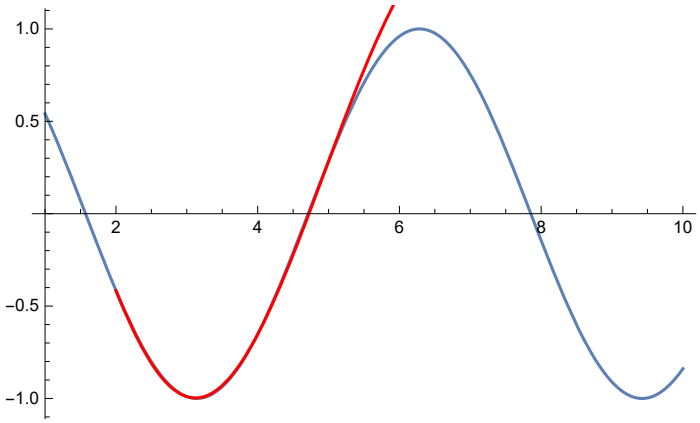
```
Show[{Plot[k^3, {k, 1, 10}],
  Plot[pol /. t → k, {k, 2, 8}, PlotStyle → Red, PlotLegends → {"interpolant"}]}]
```



Test 2

```
pol1 = fun[Cos[#] &, 1, 1, 5];
```

```
Show[{Plot[Cos[k], {k, 1, 10}], Plot[pol1 /. t → k, {k, 2, 8}, PlotStyle → Red]}]
```




```
pol2 = fun[Cos[#] &, 1, 1, 10];
```

```
Show[{Plot[Cos[k], {k, 1, 10}], Plot[pol2 /. t → k, {k, 2, 8}, PlotStyle → Red]}]
```